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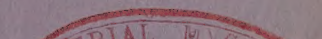

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THE

VETERINARY BULLETIN

Vol. 9.] March, 1939. [No. 3

DISEASES CAUSED BY BACTERIA AND FUNGI

I. Hadley, F. B. (1936). **Rennet Test for the Detection of Mastitis.**—*J. Dairy Sci.* **19.** 165-169. 2 tables. [10 refs.]

II. Burkey, L. A., Sanders, G. P., & Cone, J. F. (1936). **The Significance of Bacterial and Chemical Changes Occurring in Mastitis Milk and their Correlation with Milk Production.**—*Ibid.* 496.

III. Little, R. B. (1938). **Bovine Mastitis III. A Comparison of the Bacteriological and Physiological Reactions of Normal and Mastitis Milk from Young Cows.**—*Cornell Vet.* **28.** 23-33. 3 tables. [Numerous refs.] [See also *V. B.* **8.** 263].

IV. Fay, A. C., Cave, H. W., & Atkeson, F. W. (1938). **Detection of Mastitis by the Brom-Thymolblue Test, Leucocyte Count, and the Microscopic Examination of Incubated Samples of Milk.**—*Ibid.* 40-50. 6 tables.

I. In the test here described, 0·1 c.c. of 1 : 50 commercial rennet solution is added to 5 c.c. of milk, which is then incubated at 22°-28°C. for one hour and examined for evidence of coagulation. Samples from individual quarters must be used, and mid-milk or strippings in preference to fore-milk. The result often varies from week to week.

A comparison with other methods of diagnosis on 314 quarter samples, of which 21% were classed as abnormal on the combined evidence of all the tests used, showed that the rennet test gave almost the same number of positive results as the catalase or bacteriological tests, but less than the brom-cresol-purple or chloride tests. The test is dependent on the amount of casein present and is of particular value for the detection of those samples which are unsuitable for cheesemaking. Poor coagulation indicates subnormal casein and mastitis.

II. The authors followed, by weekly milk examinations, the changes in numbers of organisms, leucocytes, chlorides, pH, non-casein nitrogen, rennet coagulation time, and milk yield of first-calf heifers infected with streptococcal mastitis. They conclude that these changes follow a definite sequence, but that certain changes (*e.g.*, the number of organisms, cells and chlorides) reach a peak earlier than others (*e.g.*, the pH and non-casein nitrogen), whilst others (*e.g.*, the cell content and milk yield) show more prolonged changes. It is also suggested that certain changes regarded as evidence of inflammation, *e.g.*, increase of cells and alteration of rennet coagulation properties " may predispose to infection with *Str. mastitidis*."

III. A review is given of the results obtained by a daily laboratory examination of fore-milk from 31 quarters of eight first-calf heifers before and after experimental infection with mastitis streptococci. Fore-milk was used (including the first stream), usually without centrifuging. The pH was determined on a plate with phenol red, brom-cresol-purple and methyl red, the chlorides by a modification of Rosell's method, the leucocyte count by Prescott and Breed's direct method, and the bacteriological control by deep plating in blood agar and subsequent identification of suspect colonies by the usual methods.

In 1,010 daily examinations made before infection, most of the results fell within the limits generally accepted for normal milk, *viz*, pH about 6·6, chlorides 0·135% or less, and leucocyte count 3×10^5 per c.c. or less—in 70% of cases it was under 500.

After experimental infection, 2,163 daily examinations were made. It was found that plating in blood agar gave more reliable results than any other method, typical haemolytic streptococci being detected on every occasion. In 65% of the examinations, the total bacterial count was 3×10^3 to 2×10^4; the higher counts contained usually only haemolytic streptococci. The next most reliable test was the leucocyte count; in 94% of examinations, it was between 3×10^5 and 4×10^7 or over per c.c. The pH and chloride tests proved of less value because about half the samples gave values within the limits of normality, and many others, values only slightly above these limits.

A table is given showing that in 24 tests made 3-10 days after inoculation in two heifers, the first milk drawn contained over ten times as many streptococci as middle milk or strippings.

IV. Cows belonging to the Kansas State College herd (about 112 head) were divided into three classes on the basis of monthly examinations (fortnightly examinations in doubtful cases) *viz* :– Class A—animals which were regarded as free from mastitis; Class B—animals regarded as suspicious because of a high leucocyte count (5×10^5 or more per c.c.) in the milk from one or more quarters; Class C —cows regarded as positive because of the presence in incubated milk samples (about 16 hours at 37°C.) of long chained streptococci and, usually, an associated high leucocytic count. Bromthymol blue tests were also made.

Nearly 7,000 comparative tests of the three methods referred to above were carried out and the following conclusions were reached :– A positive bromthymol blue result is very good evidence of mastitis, being misleading less than once in ten times: nearly four fifths of the tests from positive quarters were, however, negative. A negative bromthymol blue result is therefore of doubtful significance: in fact, in this herd, although there were many more mastitis-free than mastitis-infected cows, the chances of a negative result being correct or false were even. Leucocyte counts above 5×10^5 per c.c. were found in only about one-third of those samples which showed long-chained streptococci. Long-chained streptococci were not found in about one out of seven samples from quarters which had already been classed as infected owing to the presence of such streptococci. Leucocyte counts above 10^5 per c.c. and chains of medium length were frequently found to be indicative of impending mastitis. Some cases, however, occurred without any warning. Mastitis was found in 13% of heifers in their first lactation, in 38% of animals in their second lactation and in an increasing percentage of animals in later lactation periods.

Experience showed that when an animal had once been justifiably removed from Class A to Class B or C, it was seldom wise to put it back in a higher class. Certain animals, after extensive tests, were so re-classified, and in nearly all cases the animals had later to be brought back again to a lower class.—A. W. STABLEFORTH.

I. White, G. C., Anderson, E. O., Johnson, R. E., Plastridge, W. N., & Weirether, F. J. (1937). **Infectious Bovine Mastitis. 5. Bovine Mastitis and Milk Yield.**—*Bull. Storrs agric. Exp. Sta.* No. 220. pp. 35. 6 tables, 5 graphs, 1 appendix. [8 refs.]

II. Plastridge, W. N., Anderson, E. O., & Seremet, J. S. (1938). **Infectious Bovine Mastitis. 6. A Laboratory Procedure for the Detection of Bovine Mastitis.**—*Ibid.* No. 224. pp. 12. 3 tables. [6 refs.]

I. The authors present detailed data regarding the yield of 35 cows in their own College herd and 22 in another herd, a total of 104 " normal " lactations and 116 " infected ". In some of these cases, the cows became infected during the study and a comparison was therefore possible of the yield before and after infection. Four tests for mastitis were used and the results are given as based on the composite results of these tests, and on the result of each individual test.

Corrections were made for age, length of lactation and number of daily milkings. As judged by the composite result of the four tests, mastitis caused a loss of 6·5 and 5% respectively in the two herds. With one infected quarter, the loss was negligible, but reached 12 and 11·2% respectively where all four quarters were involved. Based on the bromthymol blue test alone, the losses ranged from about 1% with one quarter reacting, to over 12% with four quarters reacting. Based on the leucocyte content or sediment content alone, losses were similar. Heavier losses are reported when the infection was diagnosed on the basis of the presence of *Streptococcus agalactiae* than when mastitis was diagnosed by a non-specific or indirect test. Staphylococci were associated with less severe losses.

About three quarters of the reacting animals showed a loss in yield, though some went through one or more infected lactations before the yield was reduced or the milk altered in appearance. Some cows showed a certain recovery in yield. Shortening of the lactation period was not observed nor any evidence of a reduction of fat.

The authors note that, whilst in these herds there was no rigorous culling of mastitis reactors, all acute and definitely clinical cases were eliminated fairly promptly and that, when surplus animals had to be disposed of, preference was given to mastitis reactors. They emphasize therefore that, the animals being mostly in the earlier stages of the disease, the actual reduction in yield in the average herd is probably much greater.

II. The first part of this article is concerned with the behaviour of the groups of mastitis and other streptococci from milk samples described earlier by the workers at Storrs, on the differential crystal violet-aesculin medium described by Edwards [*V. B.* **4.** 303]. All of 92 cultures of *Str. agalactiae* produced characteristic grey-blue colonies with narrow zones of haemolysis : 19 cultures of streptococci previously described as *Str. pseudo-agalactiae* or group S_1 (both biochemically nearly similar to *Str. agalactiae*, but serologically different) produced either grey-blue colonies like *Str. agalactiae* or colonies which were brown due to splitting of the aesculin : all of 45 strains of *Str. uberis* (*i.e.*, mastitis streptococcus Group III of Edwards) and all of 53 cultures regarded as saprophytes, produced brown colonies and browning of the medium.

The second part is concerned with the results obtained by plating on Edwards' medium 525 milk samples which showed streptococci after overnight incubation ; 325 of the samples gave weakly haemolytic grey-blue colonies and 311 (95·7%) of this number proved by other tests to be *Str. agalactiae* : 78 gave non-haemolytic grey-blue colonies, and 74 (94·9%) of these proved to be *Str. agalactiae*. Further examination of 122 cultures which gave brown colonies showed that only 4·1% of these had the characters of *Str. agalactiae*. The authors conclude that Edwards' medium is about 95% efficient in separating *Str. agalactiae* from other streptococci

present in freshly drawn milk, and that for this reason, and because it facilitates the detection of *Str. agalactiae* even in the presence of large numbers of staphylococci, it is of definite value in the routine laboratory diagnosis of mastitis.

Finally, they describe a routine procedure for the detection of mastitis which is briefly as follows :– (1) " presumptive " tests, consisting of appearance of the sample, a bromthymol blue test, and a leucocyte count ; (2) the incubation of 10 c.c. samples at 37°C. for 16-20 hours ; (3) microscopic examination for streptococci ; (4) surface plating on crystal violet-aesculin medium of all samples containing streptococci, and surface plating on this medium and also on plain cow blood agar (in order to detect other organisms such as *C. pyogenes*, staphylococci, *Bact. coli*, etc.), of all samples which were positive to the " presumptive " tests, but showed no streptococci in incubated milk samples ; (5) examination of the plates after 24 hours', or preferably 48 hours', incubation, and (6) further identification of selected colonies, particularly where *Str. agalactiae*-like colonies are found in samples which were negative to the " presumptive " tests or in samples from previously uninfected cows. The animals are classed in five groups on the basis of these tests :– Group I, negative ; Group II, positive to " presumptive " tests, but showing no streptococci ; Group III, positive to " presumptive " tests and showing streptococci other than *Str. agalactiae* ; Group IV, negative to " presumptive " tests, but showing *Str. agalactiae* or the so-called *Str. pseudo-agalactiae*, and Group V, positive to " presumptive " tests and also showing *Str. agalactiae*.

—A. W. STABLEFORTH.

MILLER, W. T., & JOHNSON, H. W. (1938). **Bovine Mastitis. The Relation of Streptococci to Physical Changes Occurring in the Udders of Dairy Cows.** —*Amer. J. publ. Hlth.* **28.** 1222-1230. 6 tables. [Numerous refs.]

Milk samples from 629 cows in nine herds were examined for streptococci, using :– (a) the so-called Hotis test, [*V. B.* **8.** 555.], (b) microscopic examination of incubated milk, and (c) cultivation of incubated milk on horse blood agar plates. Streptococci were detected in milk samples from 298 (47·4%) animals belonging to five herds ; no streptococcus-infected cows were found in the remaining four herds with a total of 82 cows. The incidence was highest in the largest herds.

Cultures were obtained from 276 of the 298 milk samples ; the reactions of 230 of these cultures indicated that the organism was *Str. agalactiae* or, in a few instances, " closely related to it." [Twenty-six of the remaining 46 cultures fermented mannite and aesculin and reduced milk containing methylene blue in concentration of 1 : 10,000 (? Group III of MINETT, STABLEFORTH and EDWARDS)].

The udders of 617 cows were palpated for indurations after being milked out, and classified according to the plan described by UDALL and JOHNSON [*V. B.* **5.** 594]. The results can be tabulated :–

Cows	Class 1 (free from induration– normal udders)	Class 2 (slight induration)	Class 3 (definite induration)	Class 4 (marked physical evidence of mastitis)
Infected ...	7	53	159	72
Non-infected	38	96	162	30
	45 (7·3%)	149 (24·1%)	321 (52%)	102 (16·5%)

The percentage of Class 4 cows found in the present enquiry is not considered abnormally high when compared with figures previously reported by the Bureau of Animal Industry. On the other hand, about 35% of the cows had good or reasonably good udders. In brief, from their observations in these herds, the authors conclude :– (1) that if streptococci were eliminated as causal agents a certain amount of mastitis would still be present, and (2) that clinical examination of the udder is valuable as a means of detecting cows which have or have had mastitis, irrespective of the cause, and of eliminating animals with badly diseased udders.

[While one would not disagree with the first of these conclusions, in the abstractor's opinion, the elimination of cows with chronic mastitis due to organisms other than *Str. agalactiae* on the basis of a clinical examination alone would sometimes be an unnecessarily wasteful procedure. A more important conclusion is that 60 out of 194 cows referred to in the table were excreting streptococci in the milk although clinically they had " normal or reasonably good " udders].—F. C. M.

I. Johnston, T. (1938). **Anatomical and Experimental Study of the Teat of the Cow with Particular Reference to Streptococcal Mastitis.**—*J. comp. Path.* **51.** 69-77. 10 figs., 1 table. [11 refs.]

II. Foot, A. S., & Shattock, P. M. F. (1938). **The Incidence of Mastitis in Cows Yielding Milk Low in Solids-Not-Fat.**—*J. Dairy Res.* **9.** 166-173. 3 tables. [10 refs.]

III. Rowland, S. J., & Zein-el-Dine, M. (1938). **The Casein Number. A Chemical Method for Diagnosis of Mastitis.**—*Ibid.* 174-181. 1 fig., 3 tables. [8 refs.]

IV. Rowland, S. J., & Zein-el-Dine, M. **The Effect of Subclinical Mastitis on the Solids-Not-Fat Content of Milk.**—*Ibid.* 182-184. 2 tables. [2 refs.]

I. It is now generally accepted that under natural conditions pathogenic streptococci reach the udder tissue by way of the teat canal, but attempts to establish infection experimentally by the application of infected material to the end of the teat have frequently proved unsuccessful unless the closing mechanism was impaired or there was alteration in the duct, resulting from injury produced accidentally or experimentally.

The first part of J's contribution deals with the anatomical features of the teat, the second with certain experiments showing possible ways in which some of these features may predispose to infection. Amongst other things, it is shown that in some teats the lining membrane of the sinus shows a number of pouches, whilst in others there are folds which may even divide the teat into half, and that at the upper edge of the duct itself, the epithelium projects so as to form a kind of rosette around the opening into the sinus.

Experimental confirmation is given for the accepted fact that squeezing of the teat in milking must force milk from the teat sinus up into the lactiferous sinus or main ducts. An important finding, however, is that carbon particles which are milked through the teats tend to remain in the pouches, around the rosette and on any other irregularity or abrasion on the inner surface.

It is considered that a normal duct may be opened by the excessive pressure which occurs during over-stocking or, particularly in the case of the hind quarters, when the cow lies down or moves, and that such organisms, once having entered the udder, may be held effectively by pouches or abrasions as above. Since a normal duct of average dimensions, and a strong sphincter devoid of pouches and other irregularities, may be transmissible anatomical features, it is suggested that

these features may be responsible for the hereditary resistance suggested by one or two workers as existent in mastitis.

II. The authors conclude that when difficulty is experienced with milk which is low in solids-not-fat, one of the first steps should be to control clinical and sub-clinical mastitis.

It was found, in an investigation covering 29 herds with approximately 770 cows, that 19·5% of the animals in milk during the first three months of 1937 were yielding milk low in solids-not-fat as estimated at two consecutive milkings. Of these cows (excluding those in which lactation was advanced) evidence of mastitis infection was found in 61·5%. Re-examination of some cows suggested that the actual infection was probably about 70%. About two-thirds of these infections were sub-clinical or latent and one-third clinically evident. Cows in the same herds giving milk which was normal or high in solids-not-fat were not examined for evidence of mastitis.

III. The authors investigated the value of a determination of the casein number $\left(\frac{\text{percentage of casein nitrogen}}{\text{percentage of total nitrogen.}} \times 100\right)$ for the detection of chronic bovine mastitis (*Str. agalactiae* infection), using samples from 247 quarters of 62 cows; 49% of the quarters and 74% of the cows showed *Str. agalactiae* in the samples examined. Mastitis decreases the casein number by reducing the casein and at the same time increasing the albumin, globulin and proteose-peptone.

The total nitrogen content varied from 362 to 687·4 mg. per 100 ml., and the casein nitrogen from 153 to 554 mg., the casein number being 42·3 to 83·4. Samples from the uninfected quarters of Shorthorns, Friesians, Ayrshires and Guernseys gave, as average figures, 79·2, 80·4, 79·5 and 80·3 respectively; samples from infected quarters of the first three breeds gave 71·7, 74·1 and 70·3 respectively.

It is suggested that a figure of 78 or less should be taken as indicating an infected quarter. On this basis, the casein number test differed from the bacteriological in 21 out of 243 quarters, *i.e.*, 8·6%. It is pointed out that in certain cases the bacteriological test may have failed and that in any case samples giving 78 or about might perhaps be regarded as doubtful.

IV. Using the same samples of milk, the authors determined what correlation, if any, existed between the presence of mastitis streptococci (*Str. agalactiae*) and of a low solids-not-fat content (expressed as a percentage of fat-free milk).

The solids-not-fat figure for 114 uninfected samples varied from 8·24 to 10·28; 9% of these were below 8·8 (the standard figure taken as corresponding to the legal presumptive minimum of 8·5% for whole milk) and these averaged 8·56. On the other hand, the solids-not-fat figure for 121 infected samples varied from 4·26 to 9·92; 63% were below 8·8 and these averaged 7·93. This effect of mastitis infection was found to be similar in the four common breeds. Looked at in another way, 88% of the samples which were below 8·89 were infected, and it is concluded that sub-clinical mastitis accounts for a very high percentage of samples low in solids-not-fat.—A. W. STABLEFORTH.

SHERMAN, J. M. (1936). **Hemolytic Streptococci in Milk.**—*Rep. N.Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 95-104.

S. describes the four main types of streptococcus to be found in milk:—*Str. pyogenes* causing human infections, *Str. mastitidis* causing bovine mastitis, the haemolytic enterococcus type, which appears to be non-pathogenic, and an "animal pyogenes" which causes a variety of pyogenic infections in animals, but which does not so far appear to be pathogenic for man. Tests for the differentiation

of these streptococci are given. He also refers to other, intermediate types of streptococcus, besides those enumerated above; these are difficult to distinguish, and little is known about their pathogenicity. He suggests that at present some milk is condemned because of the presence of completely harmless haemolytic types, and that more work should be done on the differentiation of pathogenic from non-pathogenic streptococci.

I. Miller, W. T. (1936). **The Pathological Changes in the Udders of Cows with Marked Physical Cases of Mastitis.**—*Rep. N.Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 221-226.

II. Klein, L. A., Kleckner, A. L., & Scheidy, S. F. (1938). **Str. agalactiae Infection in Heifers Prior to Parturition.**—*Vet. Ext. Quart. Univ. Pa.* **38.** No. 70. 3-9. 1 appendix. [7 refs.]

I. M. gives a detailed account of the histopathology of infected udders, examinations being carried out on udders from cows condemned for marked clinical mastitis. Pathological changes were found to be extremely varied, but were not usually striking; out of 1,216 quarters examined by M., only 12 were found to contain true abscesses or purulent foci. Usually it was observed that the interalveolar tissue had become hypertrophied, compressing the alveoli and was filled with fibroblasts, round cells singly and in clumps, polymorphs and some eosinophiles. In the majority of the sections examined, there was little sign of acute inflammation, such as haemorrhage, oedema, or increased vascularity of the part.

II. Swelling of the udder occurred in a group of ten heifers which when examined were six months in calf. The animals were under observation for four months. The affected quarters were not hot or painful; beta-haemolytic streptococci were being excreted from six of the animals when first examined, but had disappeared from all except one of these in the ensuing six weeks.

The authors speak of severe mastitis in the herd when these heifers were born, and suggest this may have led to infection.

I. Breed, R. S. (1936). **The Significance of the Cell Count in Milk.**—*Rep. N.Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 205-211. 2 figs.

II. Hucker, G. J. (1936). **The Significance of Cell Count in Milk.**—*Ibid.* pp. 213-220. 5 tables.

I. This article consists of histological notes on the normal secreting udder. In B's opinion, " body cells " is a more accurate term to use in speaking of the cell count in milk than either " pus ", " leucocytes ", or merely " cells ". Body cells found in milk are commonly due merely to normal tissue wastage, and do not mean that the udder is infected.

II. Epithelial cells in milk only indicate abnormality when in excessive numbers. A significant cell count (leucocytes and other cells) would be 500,000 per c.c. for milk from a single quarter, or 100,000 per c.c. for can samples. He considers that the cell count is a severe test, and should be used with discretion as a test for mastitis. The count tends to be higher in machine-milked than in hand-milked cows.

I. Morrill, C. C. (1938). **A Histopathological Study of the Bovine Udder.** —*Cornell Vet.* **28.** 196-210. 8 figs. on 4 plates, 2 tables. [9 refs.]

II. Ferguson, Jean. (1938). **The Distribution of the Mastitis Streptococci in Dairy Herds.**—*Ibid.* 211-220. 3 figs., 3 tables. [10 refs.]

III. Gibbons, W. J. (1938). **The Histopathology of Mastitis. A Preliminary Report.**—*Ibid.* 240-249. 9 figs.

I. M. studied the histopathology of the mammary glands of 20 cows and

heifers most of which were affected with mastitis : 15 were in some stage of lactation, two were in the dry stage and three had never lactated. The histological state of each group is discussed briefly, and explanations of the origin of corpora amylacea, and of their presence in intralobular connective tissue in some instances, are suggested.

The most common lesion was an exudation of polymorphonuclear leucocytes, but productive changes in the stroma were nearly as frequent. The so-called subacute interstitial mastitis, characterized by numerous lymphocytes and macrophages, was much less frequent. Marked vacuolar degeneration of the alveolar epithelium was present in many areas, especially those showing exudation of polymorphs. Chronic productive changes are believed to affect the quantity of the secretion more often than the quality, owing to replacement of the secreting elements. Alterations of secretion were most marked in areas showing recent acute inflammation. The changes were on the whole much greater and more frequent in the lower planes of the quarter, support being thus given to the belief that infection occurs *via* the teat canal. As a result of the study, streptococcal mastitis is looked upon as a chronic and insidious but unmistakably progressive process disposed to occasional acute exacerbations ; in these, progression may be wide and rapid, resulting in wholesale destruction of glandular tissue.

In two cows in which milking was suddenly stopped 8 or 9 days before slaughter, there was a wide-spread and recent extension of the inflammatory changes in the infected quarters. Another point of some interest is that of the quarters which showed decidedly chronic processes or productive changes, nearly all also showed evidence of recent acute changes in certain areas. Of the 60 quarters of the 15 cows in lactation, 37 had shown streptococci, but in 23 none had been found [method of examination not given].

Two blocks, one for frozen sections and the other for paraffin sections, were prepared from each of 13-39 areas in each adult animal, and from a smaller number of areas in heifers. Supramammary lymph nodes were also examined.

II. Quarter milk samples from all cows in 18 herds were examined for the presence of streptococci, 0·1 c.c. of fore milk being plated in deep horse blood agar. Of the total 655 animals in these herds, 21 % showed streptococci. Of 229 infected quarters in these animals, 70 % showed *Str. agalactiae*; 7 %, *Str. dysgalactiae*; 10·8 %, *Str. uberis*; 5·6 %, streptococci of other kinds, and 6·5 % unidentified streptococci. The author states that the streptococci referred to as *Str. dysgalactiae* and *Str. uberis* are those originally described by MINETT, STABLEFORTH and EDWARDS [*V. B.* **2.** 588.] as " mastitis streptococci Groups II and III " respectively.

The extent of infection varied widely in the different herds. No streptococci were found in one herd. Seven herds showed only streptococci other than *Str. agalactiae*—usually *Str. dysgalactiae* or *Str. uberis*—and in these herds the infections were few in number and apparently sporadic ; small numbers of these infections also occurred in herds infected with *Str. agalactiae*. The remaining ten herds showed animals infected with *Str. agalactiae*, and in these it was the predominant organism and the incidence of infection was high (16-77 %).

As regards haemolysis nearly half the strains of *Str. agalactiae* yielded the usual narrow zone kind, a few were of the kind that produce wide zones with hazy edges, and the remainder produced non-haemolytic or green types; only one kind of haemolysis was present alone or in marked predominance in any given herd.

A table is given showing the reactions of the various streptococci in an extensive series of biochemical tests: the view being supported that use of the blood agar plate followed by tests in aesculin, sodium hippurate and litmus milk is a valuable method for the prompt identification of mastitis streptococci.

III. G. begins by a short description of the anatomy and histology of the normal glands, following this by details of the changes found in various stages or kinds of mastitis. He classifies these as follows :– thelitis, or inflammation of the teat, which results from injury or lesions caused by various diseases and predisposes to mastitis ; acute catarrhal galactophoritis, which is usually a transitory stage of the extension of inflammatory changes, and the following forms of mastitis proper, *viz*, acute parenchymatous, acute suppurative, acute gangrenous, chronic productive and those specific forms found in tuberculosis and actinomycosis.

The most common lesion is a progressive chronic inflammation initiated by a mild parenchymatous inflammation or by one or more attacks of an acute nature. Microscopic studies are held to support the view that infection takes place through the teat canal, the oldest and most chronic lesions being usually found adjacent to the cistern or near the large collecting ducts, indicating " spread of the infection upwards by continuity ". Chronic productive changes and mild parenchymatous changes were often found in various parts of the same infected quarter. The normal and morbid histology of the gland is held to indicate " the futility of treatment in anticipation of a complete cure and that the control of the disease therefore lies in prevention ".

[It is probably safe to assume that the lesions here referred to were usually of streptococcus origin. The value of G's further studies will be greatly enhanced if the nature of the causal agent is correlated with the histological picture].

—A. W. Stableforth.

Mežaks, P. (1938). O vospalenii vjimeni u korov. [**Bovine Mastitis**].—*Protokol. III. Vet.-Kongr. Balti. Staaten, 1937.* pp. 57-59.

Of the forms of bovine mastitis occurring in Latvia, " parenchymatous mastitis " [presumably streptococcal] is the most common : the clinical character and treatment are briefly described.

Mastitis of tuberculous, actinomycotic and botriomycotic origin are rare in Latvia.

Stone, Doris M., & Gray, J. D. A. (1937). **Further Investigations on Non-Caseous Lymphadenitis in Imported Lamb and Mutton.**—*Med. Offr.* **58.** 175-177. 1 table. [2 refs.] [See also *V. B.* **6.** 97].

The authors isolated a streptococcus from the lymph nodes of carcasses of imported sheep affected with " non-caseous lymphadenitis ". They were able to reproduce the lesions in three experimental lambs and in laboratory animals, and recovered the organism from the local lymphadenitis so set up. All the experimental lambs had footrot and an enterococcus was isolated from the lymph nodes draining the feet.—M. F. Benjamin.

Henry, M. (1936). **A Further Note on the Incidence of Anthrax in Stock in Australia.**—*Aust. vet. J.* **12.** 235-239. 2 tables. [1 ref.]

In a previous paper [(1922). *J. roy. Soc. N.S.W.* **56.** 54.], H. emphasized the remarkable freedom of Australian wool from anthrax spores, and traced the history of anthrax in Australia from the first reported case in 1851 to the year 1921. It was then shown that, of all the States of the Commonwealth, the disease occurs only in New South Wales and Victoria, the extent of infection being much less in the latter. Further records for the years 1921 to 1936 are produced and are discussed under the headings of annual incidence, seasonal incidence, localization, mortality, areas of country involved in outbreaks, and vaccination. The majority of outbreaks occur in a comparatively small area in New South Wales, and the

approximate average annual mortality in that State from June 30th, 1924 to June 30th, 1936 (excluding 1930-1931, for which figures were incomplete) was 1,237 sheep, 21 cattle, 1·3 horses and 1·2 pigs. In 1930 an outbreak was considered to be traceable to the transference of infected soil which was carried in a dust storm from an infected to a hitherto anthrax-free area in N.S.W.

H. remarks upon the misleading statement in HUTYRA and MAREK's " Special Pathology and Therapeutics of the Diseases of Domestic Animals " which, in the 1926 edition, placed the loss of sheep in Australia from anthrax at 300,000 *per annum*. [The 1938 edition states that anthrax still causes considerable damage in Australia. It must be realized, however, that a loss of even 2,000 sheep *per annum* from a total exceeding one hundred million is really small].—T. S. GREGORY.

HEGYELI, Z. (1937). A Bac. anthracis virulentiájának fokozása és gyengitése táptalajokkal. [**Cultural Exaltation and Attenuation of** *Bacillus anthracis*]. —*Állatorv. Lapok.* **60.** 17-19.

H. states that avirulent strains of anthrax used for vaccines can be changed to virulent, capsulating strains with immunizing power, by 5-10 successive inoculations into broth mixed with an equal quantity of amniotic fluid, followed by 1-5 sub-cultures in ordinary broth (pH 7·4), or better, in broth with a base of fresh egg-white. Also, if anthrax bacilli of high virulence are passaged many times (100-150 if necessary) through ordinary broth or broth containing spleen extract, and then through swine blood serum, they are attenuated in such a degree as to yield a good strain for vaccine. A lessening of virulence likewise occurs when the anthrax cultures, after development in the above-mentioned culture media, are stored for a considerable time in an incubator, the cultures being reinoculated on ordinary agar cultures every ten days.—G. SÁLYI (BUDAPEST).

KUJUMGIEFF, I. (1938). Il prontosil quale mezzo di differenziazione del Bacillus anthracis dai germi saprofiti similcarbonchiosi. [**Differentiation of** *B.a.* **and** *B. pseudo-anthracis* **by Growth in Prontosil Added to Culture Broth**].—*G. Batt. Immun.* **20.** 1010-1017. [11 refs.] [English, French and German summaries].

During some experiments with prontosil, K. found that when 2-3 drops of [? undiluted] prontosil were added to broth cultures of *B. pseudo-anthracis* the red colour which immediately forms disappeared completely after 48 hours' incubation ; the colour persisted, however, for 4-7 days in broth cultures of *B. anthracis*. —J. A. NICHOLSON.

SFORZA, M. (1938). Ricerche sul comportamento della vaccinazione anticarbonchiosa con carbozoo in bovini affetti da piroplasmosi, tripanosomiasi e peste bovina. [**The Effect of Vaccination against Anthrax with Carbozoo on Cattle Affected with Piroplasmosis, Trypanosomiasis and Rinderpest**].—*Clin. vet., Milano.* **61.** 291-305. [6 refs.]

From experience in Eritrea, S. concludes that anthrax vaccination can be applied to cattle which are infected with trypanosomes or piroplasms, provided that they are not acutely ill at the time. The progress of a fresh trypanosome infection appeared to be accelerated by anthrax immunization, though it did not lead to death.

The carbozoo vaccine should not be used during a rinderpest outbreak.

I. Ritter, H., & Nothdorff, G. (1938). Serologische Milchuntersuchungen im Rahmen des Tuberkulosebekämpfungsverfahrens aus den Jahren 1933-1936. [**Serological Milk Tests Carried out in the TB. Control Scheme in Germany from 1933-1936**].—*Zlb. Bakt. I.* (*Orig.*). **141.** 171-186. 8 tables. [Numerous refs.]

II. Treml, F. (1937). Tilgung der Tuberkulose des Rindes. [**Control of Bovine TB. in Czechoslovakia**].—*Prag. tierärztl. Arch.* **17.** 171-175.

III. Pröscholdt. (1938). Ueber die Bedeutung der Tuberkulinprobe für die Diagnose und Tilgung der Rindertuberkulose. [**Importance of the Tuberculin Test for the Diagnosis and Eradication of Bovine TB.**]—*Ibid.* **18.** 85-98.

IV. Rolle, M. (1938). Ueber die Bekämpfung der Rindertuberkulose. [**Control of Bovine TB.**]—*Protokol. III. Vet.-Kongr. Balti. Staaten, 1937.* pp. 33-37. [In German].

I. During the years 1933-1936 inclusive, 20,000 samples of milk, some single samples from each cow, others quarter samples, were examined by the complement-fixation test, for the performance of which a shortened method is described. The test was found to be specific and of value in detecting udder TB. Occasional false negative results (12 out of 14,011) were encountered, and were considered to be due to the temporary loss of demonstrable antibodies. A negative serological test, however, was considered to rule out the possibility of the presence of *Mycobacterium tuberculosis* in the milk, and thus to render unnecessary microscopic and biological tests on, in this series, 94% of the samples. A positive test was not related to the presence of tubercle bacilli in the milk, and merely indicated that further tests should be applied for the demonstration of the organism. Up to 9·4% of the serologically positive but clinically negative cows, and up to 30% of the serologically positive and clinically suspicious, were found to be excreting the bacillus.

II. It is calculated that the degree of infection from TB. in Czechoslovakia [1937] was as follows :– cows, 18·1%; bulls, 3·5%; oxen, 22·5%; young cows (1-2 years), 13·0%, and calves, 9·3%. From these figures, the total number of animals infected is said to be 667,000 out of 4,300,000 head of stock. As a control measure, the building up of clean herds by means of the tuberculin test is advocated; it is pointed out that eradication is a matter in which all types of veterinary and agricultural workers must co-operate, and for which state aid is essential together with increased prices for milk from herds free from infection.

III. The various methods of tuberculin testing are described, and the intradermal advocated as the routine test. Of 30,000 animals examined, 50% of the cows, 40% of the bulls, 30% of the young animals and 14% of the calves gave positive reactions. The procedure to be adopted and the measures to be taken to eliminate TB. from a herd are discussed.

IV. There appears to be considerable difference in the interpretation of the single intradermal tuberculin test as it is performed in different countries. Some consider an increase of 3-4 mm. in the skin thickness to be positive, others that any increase less than 7 mm. is negative.—P. S. Watts.

Aleksa, K., & Kažys, J. (1938). I galviju tuberkulozės paveldejimo klasima inašas. [**TB. and Heredity**]. pp. 46. Numerous tables, 2 charts. [Numerous refs.] [In French pp. 27-46]. Kaunas: Akc. "Spindulio" B-vės spaustuvė. [8vo].

This booklet gives the results of many years' observations on a large herd of cattle, and their breeding record and history with regard to TB. are shown in

tabular form. In general, no strong evidence for or against the inheritance of susceptibility to TB. was obtained : in some cases it appeared that there was such inheritance and in other cases none could be demonstrated. The tables give much interesting information.—A. PABIJANSKAS (KAUNAS).

SCHÜRMANN, E. (1937). Die Fleischbeschau im Dienst der Rindertuberkulosebekämpfung. [**Contribution of Meat Inspection Work to the Control of Bovine TB.**]—*Tierärztl. Mitt.* **18.** 291-292.

S. reports that Ostertag's method for the eradication of TB., and the compulsory slaughter of open cases, has proved a failure in Germany. To assist a scheme for the eradication of TB. by tuberculin testing and compulsory slaughter of all reactors, he suggests that animals in the abattoirs found to be infected with any form of TB. should be traced back to the herd from which they originate, so that appropriate measures may be taken there.—M. F. BENJAMIN.

I. ANDERSSON, N. (1938). Hudtuberkulosen inom Hemse veterinärdistrikt. [**" Skin Tuberculosis " (" Skin Lesions in Tuberculin Reacting Cattle ") in the Veterinary District of Hemse, Gotland, Sweden**].—*Svensk VetTidskr.* **43.** 3-11. 1 table.

II KRANTZ, G. T. (1938). Om s.k. hudtuberculos hos nötkreatur. [**On the So-Called Skin TB. of Cattle**].—*Skand. VetTidskr.* **28.** 1-26. 2 figs., 1 table. [44 refs.] [English summary].

I. By about 1920, bovine TB. was regarded as eradicated in the district, and in consequence, very few tuberculin tests were performed from then until 1930. After that year, when testing was started again, a certain percentage of herds contained reacting animals. In 1935 and 1936, practically all herds were tested and reacting animals slaughtered, but in 1937, 25·6% of herds still contained reactors. This was thought to be due partly to the very prevalent TB. in human beings and partly to the incidence of the infection in poultry. In 1936 and 1937 attention was first turned to the " skin tuberculosis " described in America, and generally called " skin lesions ".

It was observed for the first time in Hemse in 1930, and in 1936 reactions caused by this condition occurred in 59 herds. Large numbers of reactors were found in groups of neighbouring farms. No clinical disturbances were observed. Nodules were found in the subcutaneous tissue of the legs, but very seldom on the neck, chest or trunk ; nodules were sometimes found in rows, apparently along lymph vessels. It seems as though well pronounced nodules can disappear again after a month or so. Abscess formation followed by discharge of pus and disappearance of the lesion is also encountered. Sometimes a number of new nodules develop around such a lesion.

A. believes that the " skin lesion " cases observed by him are infectious, as they appeared as an epizootic. The disease causes no severe symptoms in the animals and many cases seem to recover. New infections can appear after the segregation of all reacting animals in a herd. Cattle infected with avian or human types of tubercle bacilli are retained in the herd ; search is made for the source of infection in the fowls in contact or in the personnel and it is removed. A. suggests that skin lesion cases should also be kept in the herds.

II. After a review of the literature K. describes 40 cases of this condition found on the island of Gotland. The lesions were, as a rule, localized in the subcutaneous tissue of the lower part of the legs, and of the ventral aspect of the abdomen and chest. In 32 cases the regional lymph nodes were examined, and in 12, changes resembling these of TB.—as a rule fresh epithelioid tubercles

containing Langhan's giant cells—could be demonstrated microscopically. Acid-fast bacilli were found in subcutaneous nodules from 35 cases and in adjacent lymph nodes of seven. As a rule, the rods were somewhat shorter than ordinary bovine tubercle bacilli, and frequently had lumpy ends ; acid-fast granules were often met with. All 40 animals reacted to the tuberculin test, 39 to the intradermal and one to the subcutaneous test. In 11 animals alterations could be detected clinically by palpation of the skin. Inoculation of material from nodules into g. pigs and rabbits failed to set up infection. No growth was obtained on Löwenstein's or Besredka's media. It seems most probable that infection was acquired through the skin.—H. E. Bendixen (Copenhagen).

Bareggi, G. (1938). Contributo alla conoscenza della endocardite nei bovini tubercolotici. [**Endocarditis in Tuberculous Cattle**].—*Pat. comp. Tuberc.* **4.** 64-76. 8 figs. [Numerous refs.] [English, French and German summaries].

In cattle with generalized TB. there are sometimes nodular lesions on the heart valves, usually accompanied by pericarditis. Twenty such cases were examined. The tricuspid valves were more commonly affected, and the lesions were usually more prominent on the auricular surface of the valve. In early lesions there was a small cavity containing blood ; in older lesions the cavities contained amorphous material from the breakdown of the blood corpuscles. The lesions had increased in size, largely as a result of a connective tissue proliferation, until large vegetations were formed. B. suggests that they were presumably the result of the toxic action of the tubercle bacilli.—J. A. Nicholson.

I. Mills, M. A., Gunn, F. D., & Barth, E. E. (1938). **Experimental Pulmonary Tuberculosis in the Dog.**—*J. Bact.* **35.** 453.

II. Méry, F. (1938). Les dermo-tuberculides ou tuberculoses vraies de la peau chez le chien. [**Tuberculous Lesions of the Skin in Dogs.**]—*Bull. Acad. vét. Fr.* **11.** 234-240.

I. Of common laboratory animals, the dog is considered most similar to man in relative resistance and type of lesions produced. Pulmonary lesions were produced in dogs by intrabronchial instillation (using a bronchoscope) of suspensions in mucin of living virulent human and bovine types of tubercle bacilli. Clinical studies made included blood counts, sedimentation rates, cutaneous tuberculin tests and X-ray examinations. The appearance of lesions depended more upon individual susceptibility than upon the dosage. Skin sensitivity arising from active infection occurred by the fifth to seventh day and persisted, becoming negative only in cases with rapidly progressing or advanced TB.

II. M. describes four cases in dogs. Diagnosis was confirmed by microscopic examination, complement-fixation tests, or g. pig inoculation. In these cases there were no associated reactions in the lymph nodes and no discoverable lesions of organs or viscera on P.M. examination. The bacilli were apparently attenuated, and M. suggests that they may have been of human type, though it was not possible to investigate this matter.—S. J. Gilbert.

Gianfrancheschi, G. (1937). Vaccin antituberculeux étudié sur les animaux de laboratoire (lapins, cobayes). [**Laboratory Tests of a Vaccine against TB.**]—*Boll. Sez. ital. Soc. int. Microbiol.* **9.** 196-200. [In French].

G. describes the preparation of a vaccine which is considered to confer good immunity. It is said that by means of several passages through g. pigs of a mixture

of *Bact. coli* and the tubercle bacillus, the former developed a capacity to invade the latter.—S. J. Edwards.

Holmes, M. J. (1937). **Tuberculosis in Australia.**—*Med. J. Aust.* Nov. 6th. 813-827. 11 tables, 7 graphs. [10 refs.]

Referring to infection in man by the bovine type of TB., H. states that in Australia the death rate in children is probably the lowest in the world. Nevertheless, the morbidity produced in children is by no means inconsiderable. The infection is practically confined to children under 15 years of age, affecting chiefly the tonsils and cervical and mesenteric lymph nodes; bones and joints appear rarely to be affected. H. strongly recommends that dairy herds should be tuberculin tested and reactors eliminated, and that milk should be pasteurized.—T. S. G.

I. White, C. (1937). La situation actuelle des états-unis d'Amérique en ce qui concerne la tuberculose humaine d'origine bovine. [**Human TB. of Bovine Origin in the U.S.A.**]—*Bull. Off. int. Hyg. publ.* **29.** 1649-1652.

II. Petragnani, G. (1937). Sur la tuberculose humaine d'origine bovine en Italie. [**Human TB. of Bovine Origin in Italy**].—*Ibid.* 1653-1655. [1 ref.]

III. Lange, B. (1937). Perlsuchtbazillen als Erreger der Lungenschwindsucht. [**Bovine Type Bacilli as the Cause of Pulmonary TB. in Man**].—*Dtsch. med. Wschr.* **63.** 1465-1469 and 1506-1508. 3 tables. [Numerous refs.]

IV. Oesterreich, E. (1937). Ueber prozentuale Häufung der mesenterialen Primärkomplexe bei der Landbevölkerung und ihre Erklärung durch die Milchbewirtschaftung. [**The Frequency of Mesenteric Primary Complex in Country TB. Patients, and its Connexion with Dairy Farming**].—*Beitr. Klin. Tuberk.* **89.** 128-134. [9 refs.]

V. Ketz. (1938). Der heutige Stand der Forschung über die Bedeutung des bovinen Tuberkelbazillus für die Lungenschwindsucht des Menschen. [**The Present Position of Research on Human Pulmonary TB. Caused by the Bovine Type of Bacillus**].—*Berl. tierärztl. Wschr.* June 10th. 334-335.

I. Human TB. of bovine origin is stated to be very rare in the U.S.A. and only nine cases are mentioned here, out of 227 cases of non-pulmonary TB. investigated. Practically all milk sold in towns is pasteurized, but in rural districts about 40% of consumers take milk raw; this carries little risk, however, owing to the rarity of TB. in cattle.

II. P. states that in Italy cases of human TB. of bovine origin are rare, and cites some ten cases described since 1918. Brief reference is made to the control of bovine TB. and to the isolation of tubercle bacilli from suspected material.

III. A general review of the subject, with quotations from the literature. Between 1927 and 1937, L. investigated 171 cases of TB. in adult human beings, and found bovine type infection in nine and human plus bovine type infection in three cases. He estimates that 25% of all cases of TB. in adults among country dwellers in Germany are due to bovine type infection, and stresses the need for a new bovine TB. eradication scheme.

IV. Of 503 cases of human TB. in rural areas found at autopsy at Griefswald Pathological Institute, 102 (20%) showed mesenteric primary complex, which is ascribed to infection from cows' milk in country dwellers. No bacteriological differentiation was carried out to verify the origin and type of infection.

V. A brief review of some recent literature, with special reference to reports by Goeters [*V. B.* **8.** 625.] and Lange [in III, above].—J. E.

Ligeti, M. (1934). A glycerin szerepe és a malachitzöld alkalmazásának jelentősége a bovin-typusu gümőbacillus tenyésztésénél. [**Glycerin and Malachite Green in Media for the Isolation of Bovine Type Tubercle Bacilli**].—*Kőzl. Oesszehas. élét- és kórtan Kóréből.* **26.** 189-193. [Numerous refs.]

Hohn's, Löwenstein's, Petragnani's and Sweany and Evanoff's media were very suitable for the cultivation of tubercle bacilli obtained from 32 infected organs of cattle. The organisms grew best on media free of glycerin, and whereas the cultures on Löwenstein's and Petragnani's media grew in 29% of the tests, the same culture media without glycerin gave growth in 65%. Malachite green had a strong inhibiting effect on the development of contaminating bacteria, for when the experimental material had previously been treated with 8% sulphuric acid, saprophytes developed in only 13% of cases on Petragnani's medium containing malachite green, but in 82% on Sweany-Evanoff medium without malachite green.—G. Sályi (Budapest).

Sarnowiec, W. (1938). Influence du bacille de Koch sur le bacille de Bang *in vitro*. [**Influence** *in vitro* **of** *Mycobacterium tuberculosis* **on** *Brucella abortus*].—*Ann. Inst. Pasteur.* **60.** 651-660. 3 tables. [7 refs.]

According to the authors, the cultivation of *Br.a.* in the presence of tubercle bacilli (human or bovine type) results in some change in the brucella, rendering it more virulent and able to stimulate stronger serological reactions. Other changes are also claimed, including the ability of the brucella to produce pro- and mid-zone effects if used for the agglutination test. [Such zone effects are occasionally noted when the sera of cattle are tested for contagious abortion by the aggl. test].

—E. J. Pullinger.

McKennedy, F. D., & Shillinger, J. E. (1938). **Transmission of Pasteurella Cuniculicida** [*Past. lepiseptica*] **in Rabbits by Breeding.**—*J. Amer. vet. med. Ass.* **93.** 161-164. 1 table.

Investigation of the breeding record of a male rabbit revealed that many of the does mated to him died of haemorrhagic septicaemia in 6-12 days. Other does so mated developed a purulent metritis and vaginitis and sterility, and died after varying periods. The male rabbit was found to have an abscess of one testicle, resulting from *Pasteurella lepiseptica* infection.

Experiments demonstrated that infection of females from the infected male could be produced without difficulty by mating, but not by ordinary contact in the same cage.—D. D. Ogilvie.

de Araujo, E. (1937). Gatos e peste bubónica. [**Cats and Bubonic Plague**].—*Hosp., Rio de J.* **12.** 769-773. [Copied *verbatim* from *Trop. Dis. Bull.* **35.** 210. Signed W. F. H.]

Cats are susceptible experimentally to plague by cutaneous (with scarification), subcutaneous and conjunctival (with or without scarification) inoculation. It was not found possible to infect cats by feeding them with plague spleen and it would seem that natural plague could only be contracted by them through food, if trauma of the mouth or intestinal mucosa took place.

Rudesill, C. L. (1937). **Tularemia from the Bite of a Nursling Kitten.**—*J. Amer. med. Ass.* **108.** 2118.

A woman was infected with tularaemia by one of two kittens of a cat which had caught and eaten a rabbit a few days before. The kittens died, but the cat recovered.—J. E.

GARD, S. (1937). Ein Colistamm mit Salmonella-H-Antigen, zugleich ein Beitrag zur Frage der Definition der Salmonellagruppe. [**A Strain of** *Bacterium coli* **with Salmonella H Antigen, and a Contribution on the Problem of the Definition of the Salmonella Group**].—*Z. Hyg. InfektKr.* **120.** 59-65. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 905. Signed W. W. C. TOPLEY].

There is, today, agreement among most bacteriologists that antigenic analysis is an extremely valuable method of type-differentiation within the Salmonella group, and many would support the view that the primary classification of the group should be made on this basis. This view, as the author points out, has been strengthened by the discovery of Salmonella strains that depart, in important fermentative characters, from the behaviour of the group as a whole—indole-forming strains of *Bact. eastbourne*, gelatin-liquefying strains of *Bact. dar-es-salaam*, or of *Bact. abortus equi*, and so on.

It is of importance, therefore, to note any instance in which antigenic components of the Salmonella group are shared by unrelated species or types. The author describes a strain of *Bact. coli*, isolated from the faeces of a case of clinical typhoid fever with perforation and haemorrhage, which possessed flagellar antigens containing components commonly found in the group phase of the diphasic Salmonellas. Cross-absorption experiments showed that the strain in question possessed the H components 1, 3, 4 and 5 of the Kauffman-White classification, together with an additional component, or components, not represented in the known diphasic Salmonellas. This strain of *Bact. coli* was itself found to be diphasic ; and in the alternative phase the H antigens showed no relationship to any of the specific or group H antigens of the known Salmonella strains.

The O (somatic) antigens of this strain of *Bact. coli* showed no relation to any Salmonella O antigen.

VAN DORSSEN, C. A. (1937). Infektionsversuche mit Salmonella enteritidis var. dublin an jungen Hunden. [**Experimental Infection of Puppies with** *S.e.* **var.** *dublin*].—*Z. Veterinärk.* **49.** 419-423. 2 tables. [Numerous refs.]

The author gives a brief summary of the literature on the subject, and describes the experimental infection by ingestion of three six-week-old puppies. By the third day the animals were dull and affected with diarrhoea, but soon recovered. When they were killed three weeks later, the organism was isolated only from the mesenteric lymph nodes. Faeces culture was positive up to five days after infection. The sera agglutinated *S.e.* var. *dublin* at from 1 : 200 to 1 : 400.—D. SLAVIN.

HART, L. (1936). **An Examination of Sixty-Four Strains of Salmonella Sp. Isolated from Poultry in New South Wales.**—*Aust. vet. J.* **12.** 233-235. [6 refs.]

Three strains were obtained from the ovaries of hens and 61 from young chickens showing symptoms of pullorum disease. The fermentation reactions of all the cultures were those of *S. pullorum*. The failure of all the cultures to ferment maltose and dulcite indicated the absence of *S. gallinarum*. As the material was collected from wide-spread outbreaks, it seems probable that *S.g.* infection does not occur in New South Wales.—T. S. GREGORY.

VILLANI, S. (1937). Sulla recettività di alcune specie di volatili all'infezione Sperimentale da *B. pullorum*. [**Susceptibility of Wild Birds to** *Salmonella pullorum* **Infection**].—*Profilassi.* **10.** 148-150. [11 refs.]

The author tested the susceptibility of various domestic and wild birds

to artificial infection with *S.p.* The virulence of the strain was first determined by subcutaneous inoculations into pigeons. Pheasants, finches, sparrows, turkeys, geese, ducks and doves were readily infected, death following within 24 hours. In every case it was possible to recover the organism from the heart blood. The lesions varied, but there was always an intense enteritis and diarrhoea and sometimes congestion of the lungs and pleura, fatty degeneration of the myocardium, and enlargement of the liver, kidneys and spleen. Doves appeared to be the most susceptible. It is concluded that wild birds may suffer from a natural infection and can act as carriers of the disease. [The behaviour of the strain of *S.p.* used for the test doses appears to have been unusual. No comment is made by V. on the rapidity with which it caused death].—J. A. Nicholson.

I. Gräub, E. (1937). Grundsätzliches zur Frage der Bekämpfung des seuchenhaften Verwerfens. [**Control of Bovine Brucellosis in Switzerland**].—*Schweiz. Arch. Tierheilk.* **79.** 20-26. [1 ref.]

II. Roots, E. (1937). Ueber die Bekämpfung der Brucellose. [**Control of Bovine Brucellosis**].—*Ref. III Balti. Valsty. vet. Kongr. 1937.* pp. 23-34. 2 tables. [In German : Russian summary].

I. Eradication is voluntary, and since 1935 has been government-subsidized both for the detection and removal of reactors and for their replacement by non-reactors. Spread of the infection in Switzerland has frequently been due to pasturing infected and non-infected animals together. It is to be noted in this connexion that for over 200 years, in one canton, turning an animal out to grass within six weeks of its aborting has been prohibited.

II. Immunization, chemotherapy and hygienic control are discussed. Dead vaccines are unsatisfactory ; live vaccine is said to be excellent in that the tendency to abort is lessened, but to be dangerous, as it sometimes causes long-standing brucella infection of the udder with excretion of large numbers of organisms. This method has, therefore, been banned in Germany. Avirulent cultures are dangerous also because the organisms might regain virulence. Chemotherapeutic measures are of little value.

The best means is hygienic control either by isolation of reactors or by their removal from the herd. The animals should be tested every two months and reactors removed or isolated.—D. Slavin.

I. Moore, W., Grinnells, C. D., & Faulhaber, L. J. (1937). **Bang's Disease in North Carolina.**—*Tech. Bull. N. C. agric. Exp. Sta.* No. 54. pp. 32. 27 tables. [7 refs.]

II. Martin, W. E. (1938). **Observations on Bang's Disease.**—*J. Amer. vet. med. Ass.* **92.** 560-562.

III. Anon. (1938). Les brucelloses dans le monde. [**Brucella Infection in Central Asia**].—*Arch. internat. Brucelloses.* **1.** 33-35. 1 table. [1 ref.]

I. This report covers eight years' work, in 25 herds, on the control and eradication of contagious abortion by means of the agglutination test. The results were generally very successful. The farms controlled were well isolated from adjacent herds, but the methods of control varied according to the facilities available. The tests performed in each herd are shown in tabular form, with descriptive notes in each case. The importance of the introduction of new cattle into infected herds in maintaining virulence and continuing the spread of contagious abortion is shown and also the self-limiting nature of the disease in herds in which no such additions or replacements are made. The results achieved enabled more rapid progress to be made, using tests of infected herds at 30-day intervals, complete

isolation, and better sanitation, while the presence of the negative herds inspired confidence and better co-operation.

II. M. is a practitioner in the State of Ohio, and in his district has always found contagious abortion to be a self-limiting disease and not of great practical importance. No abortion vaccines are used. He finds that his views vary greatly from those of other workers and presumes his experiences have been different. [On the three farms quoted as instances the disease seems to have been of a very low virulence. No exact figures are given, and no mention is made of sterility, etc.]

III. An abstract of studies on brucellosis published by the State Scientific Institute of Turkestan. Brucella infection was found to be wide-spread amongst local sheep and cattle. Examination of 1,151 human subjects in contact with these animals revealed a 10% infection. A relatively small proportion of shepherds were affected, and this has been attributed to the fact that they do not drink unboiled milk.—S. J. Gilbert.

Morrison, H. B., & Hull, F. E. (1936). **Studies on Aseptically Drawn Milk from Bang's Disease Positive and Bang's Disease Negative Cows.**—*J. Dairy Sci.* **19.** 432-433.

The authors applied the bromthymol blue reaction, leucocyte content count, agglutination reaction and examination for the presence of streptococci to 711 separate quarter samples from all the cows of two commercial dairies in Kentucky. At one dairy the brucella-infected group was kept in rigid isolation. The other dairy kept two herds; in one, isolation of brucella-infected animals was partially carried out, but no attempt at isolation was made in the other.

A comparison of all four tests at the same sampling showed that most of the brucella-positive cows were positive to all four mastitis tests and that most of the brucella-negative cows were negative to all four mastitis tests.

These results indicate the bearing which brucella infection may have upon the incidence of udder disease unless proper control and management are instituted.
—C. V. Watkins.

Guillermo, Lockart, P., & Berninzoni, T. (1936). Profilaxis de la enfermedad de Bang. [**Control of Bovine Brucellosis in Uruguay**].—*Bol. mens. Direcc. Ganad., Montevideo.* **20.** 22-31.

A general review of the great importance of bovine brucellosis in Uruguay and the need for adequate control measures. Investigations made in 1936 revealed that 650 out of 1,883 animals examined in the department of Montevideo were reactors, 81 out of 255 in the department of Canelones, 40 out of 92 in the department of San José, and 197 out of 363 in the Florida department.

The authors speak of general control and eradication measures, including necessary steps to obtain the co-operation of farmers.

Orlov, E. S. (1937). O patogennosti *Brucella abortus bovis* glja svineĭ. [**On the Pathogenicity of *Br.a.* for Pigs**].—*Sovyet. Vet.* Nos. 11-12. pp. 69-73. 3 tables.

O. carried out experiments on 79 swine 1-11 months old. Fourteen were infected with small doses (two subcutaneously with 10^5 organisms, eight *per os* with 10^8, and four into the conjunctiva with 10^6 organisms) and 65 with larger doses. There was a temporary increase in the agglutination titre, but abortin tests were negative, and no signs of illness appeared. Parturition was normal in three pregnant sows infected [no information given as to when infected].

Bacteriological and biological investigations of urine and milk of 68 of the infected animals did not reveal the presence of the organism, and no cultures could be obtained from the organs of animals slaughtered on the 50th and 85th days after infection.

O. considers that the pathogenicity of *Br.a.* for swine is insignificant, and that they cannot be agents in the spread of the infection.

Taylor, R. M., Lisbonne, M., Vidal, L., & Hazemann, R. H. (1938). Quelques notes épidémiologiques sur l'infection des chèvres et des brebis par Br. Melitensis. [*Br.m.* **Infection of Goats and Ewes**].—*Rev. méd. vét., Toulouse.* **90.** 185-205. 1 table, 5 maps. [8 refs.]

The persistence of brucella infection in ewes was investigated in 40 experimentally infected animals slaughtered after 5-72 weeks. Although all the ewes reacted positively to intradermal and agglutination tests before autopsy, *Br.m.* could be recovered from only eight cases, in two of which infection had persisted for 72 weeks.

Examination of the faeces, nasal discharge and urine of 46 naturally or experimentally infected ewes by g. pig inoculation revealed the presence of brucella in two urine samples from recently aborting ewes with positive vaginal cultures. In 65 ewes, the vaginal discharge ceased to be infective after 26 days. Excretion of brucella in the milk ceased within two months of abortion in 53 ewes, and within ten months in all of a herd of 127 goats.

The authors conclude with a scheme of proposed control measures as follows :– divide migratory flocks into healthy and doubtful and prohibit contact between them ; allocate pastures to these categories separately ; transport the doubtful flocks by railway ; supervise sheep sales ; prohibit the transportof pregnant ewes, and delay lambing until flocks have been separated.—R. O. Muir.

Rosati, T. (1938). Di una localizzazione vertebrale della brucella melitensis nella pecora. [**Vertebral Localization of** *Br.m.* **in Sheep**].—*Azione vet.* **7.** 339-342. 2 figs.

One of a flock of ewes in which abortion was prevalent developed paralysis of the hind-quarters 6 weeks after it had aborted. The agglutination test was negative, but a positive reaction was obtained with Mirri's brucellin. On slaughter, the only lesion found was an abscess between the second and third lumbar vertebrae. The abscess was covered by connective tissue and callus formation had taken place. At one point, however, the abscess entered the spinal canal, causing pressure on the spinal cord. *Br.m.* was isolated from the pus.—J. A. Nicholson.

Tarasov, I., & Kotljarova, H. (1937). K harakteristike kultur brucell, vydelennyh ekspedicieĭ Viem v podopytnom ovcesovhoze. [**Characteristics of the Brucella Cultures Isolated on the Expedition's Experimental Sheep Farm**].—*Brucellosis in Sheep.* pp. 19-22. 2 tables. Moscow : Viem Publ. Dept.

The authors state that bacteriological studies of 90 brucella strains which were obtained mostly from aborted foetuses, and of two strains from human beings on the Experimental Sheep Farm in North Caucasus, showed that, with the exception of one of the human strains, all belonged to *Br. melitensis.* The exception was *Br. suis,* obtained from a farm hand who had come to the farm only a few days before the test, and who had previously worked on a pig farm in another locality. It was further proved that all the strains were highly virulent both to the sheep and to g. pigs. The *Br.m.* strain from man was isolated in 1933, and

after having been passaged through a ewe, it proved in 1934 to be pathogenic both to g. pigs and to sheep, the minimum dose necessary to cause active infection in the latter being about 5,000 organisms introduced subcutaneously.

VERŠILOVA, P., & TARASOV, I. (1937). Brucelleznyje aborty u ovec i ih patogenez. [**Abortion in Sheep, caused by** *Brucella melitensis*, **and Pathogenesis of the Organism**].—*Brucellosis in Sheep.* pp. 69-93. 11 tables. Moscow: Viem Publ. Dept.

In the first series of the experiments described, 15 healthy, pregnant ewes were infected subcutaneously, at dates varying from one to three months after service, with a heavy dose (10^9 organisms) of the virulent strain of *Br.m.* used constantly by the Brucellosis Commission to North Caucasus. Another ewe, also pregnant, was given 2×10^{10} bacteria of the same strain *per os*. Of these ewes, one aborted on the tenth day after infection, two on the 15th, nine on the 30th, three on the 45th, and one on the 60th. The foetus of the first ewe did not yield *Br.m.* on bacteriological examination, but the dam, killed 15 days after abortion, was found to be infected. As a general rule, sowings from the aborted foetuses were positive, but a few proved sterile. Of the six aborting ewes killed and examined 5-45 days after abortion, *Br.m.* was only obtained during the first twenty days, indicating that examination of aborting ewes at later dates is not reliable for the diagnosis of brucellosis.

In the second series of experiments, 28 healthy ewes were injected (subcut.) with *Br.m.* 2-4 months before service, one four days before, and one on the day of service. The last-mentioned ewe aborted and *Br.m.* was later recovered from the foetus. The ewe infected four days before service produced a lamb which died within 24 hours, and from which *Br.m.* was also recovered. Of the 28 ewes, three were killed and examined during pregnancy; the rest, with the exception of two which aborted from traumatic causes, produced healthy lambs, indicating that infection before service did not interfere with normal gestation. Bacteriological examination of four of the delivered ewes, in addition to the three killed during gestation, resulted in the recovery of *Br.m.* from three of the seven. This recovery of the organism from animals infected 5-7 months previously does not support the findings in the first series of experiments. The authors considered it an indication of latent infection activated under the influence of pregnancy.

In the third series of experiments, 22 maiden ewes were infected (subcut.) with 10^9 *Br.m.* in July, 1934, and were served in the autumn of the same year; they were reinfected with the same brucella dose in February of the following year. Nineteen produced healthy lambs, demonstrating the immunizing effect of the first infection against reinfection with a massive dose of the organisms. Five of these ewes were examined bacteriologically 1-10 days after parturition, and *Br.m.* was obtained in only one case. When, however, eight ewes which had aborted following experimental infection, and eight more which had aborted as a result of a naturally acquired *Br.m.* infection, were subjected to similar reinfection during a second pregnancy, four aborted brucella-infected foetuses, and four produced non-viable or dead lambs, from one of which *Br.m.* was recovered.

Two years' observations on the Experimental Farm showed that up to 20% of ewes which had once aborted did so again during the following pregnancy, and that a further 23% produced non-viable lambs, both as a result of *Br.m.* infection.

The paper ends with a discussion of the results of the measures taken by the Commission during the four years of its activity, *e.g.*, the immediate segregation of diseased animals. A measure dealt with in particular is the removal of aborting ewes and their foetuses from the flocks, in consequence of which the percentages

of abortions and still births were progressively lowered from 19 and 18·4% respectively in 1933, to 5·2 and 2·6% respectively in 1936.

Laporte, A., Berson, P., & Margout, G. (1936). Un foyer briard de fièvre ondulante d'origine bovine. Trois formes anormales. [**Cases of *Brucella abortus* Infection in Man**].—*Bull. méd., Paris.* **50.** 646-650. [Abst. from abst. in *Rev. Path. comp.* **37.** 620].

The authors describe three cases of undulant fever in which the patients had been in contact with aborting cows. No bacterial work was done to prove the source of infection.

Taylor, R. M., Lisbonne, M., Vidal, L. F., & Hazemann, R. H. (1938). **Investigations on Undulant Fever in France.**—*Bull. Hlth Org. L.o.N.* **7.** 503-545. 4 figs., 9 tables. [8 refs.]

By H_2S production and the bacteriostatic action of thionin and basic fuchsin, 97% of 869 human and animal strains of brucella were classified into two types, *Br. melitensis* and *Br. abortus*, none of the *suis* variety being found. Statistics revealed a marked increase in undulant fever in man in early spring corresponding to the period of abortion among sheep and goats. Five tables show that goats, sheep and cows were the main animal reservoirs, infection in the first two being mostly due to *Br.m.* and in cows due to *Br.a.*; reference is made to the instances in which *melitensis* infection has been found in cattle. One table indicates that the risk of infection through animal contact was far greater than through the consumption of dairy products.

[This abstract only gives a bare outline of the veterinary aspects of the report. The original should be consulted].—R. O. Muir.

Mewson, I. E., & Thorp, F., Jr. (1938). **The Toxicity of Intestinal Filtrates From Lambs Dead of Overeating.**—*J. Amer. vet. med. Ass.* **93.** 165-167. 2 tables. [5 refs.]

Examination over a period of six years of intestinal filtrates from lambs which had died of overeating revealed that 115 out of a total of 256 tested were toxic for laboratory animals. Only 2 out of 87 filtrates from lambs which had died of other diseases were toxic. Twelve out of 20 of the filtrates which were toxic for laboratory animals were fatal on subcutaneous injection to sheep in doses of 5-50 c.c.

The toxin was neutralized by the antisera of *Clostridium ovitoxicum* and the lamb dysentery bacillus. It was destroyed by heating to 60°C. for 30 minutes.

These observations suggest that overeating bears a close relationship to enterotoxaemia.—D. D. Ogilvie.

Albiston, H. E. (1937). **Blackleg in Lambs following Vaccination for Enterotoxaemia.**—*Aust. vet. J.* **13.** 245-247. [2 refs.]

A. records losses in lambs following vaccination with formolized cultures of *Clostridium welchii* Type D. In two instances the vaccine contained alum, in a third it did not. Deaths resulted from blackleg within 48 hours. Cultures obtained from the lesions shortly after death contained only *Cl. chauvoei*. The latter organism was not detected in any of the vaccines used; all of these were free from pathogenic organisms. The losses occurred in lambs about two months old, and A. suggests that close grazing of bare pastures may have led to ingestion of spores of *Cl.c.*, which were transported to the tissues and remained latent until the irritant and cataphylactic action of vaccine facilitated germination and toxin production.
—T. S. Gregory.

Genev, C. (1937). Infekcii s nekroznija bacil (*Bac. necrophorus*) pri ovcetě. [**Bacillary Necrosis in Sheep**].—*Vet. Sbir.* **41.** 259-271. 5 figs. [3 refs.] [Abst. from German summary].

G. describes a wide-spread outbreak of bacillary necrosis among sheep in Bulgaria in the summer and autumn of 1936, the chief lesions being inflammation of the coronets and mouth. Though generally mild, the infection caused a mortality of 30-40% in some flocks. Microscopic examination of material from the lesions revealed large numbers of *Fusiformis necrophorus* and smaller numbers of a short, rod-shaped organism; he considered that the former were the causal organism. Heavy rain, and the presence of ticks, were considered to be the predisposing factors in the outbreak.

G. emphasizes the need for state control measures against this disease owing to its economic importance. [The condition may possibly have been contagious ecthyma complicated by anaerobic infection—see *V. B.* **8.** 525].

Rosati, T. (1938). Esperimenti di vaccinazione contra le gangrene gassose degli animali. [**Vaccination against Gas Gangrene in Animals**].—*Azione vet.* **7.** 326-338. 9 tables. [Numerous refs.]

Under this title R. deals with blackleg, malignant oedema, and bradsot. Experiments were carried out on g. pigs to determine the best method of preparing vaccines against *Clostridium chauvoei, Cl. septique, Cl. oedematiens* and "*B. bradsot*", four to six day liver-broth cultures being used.

It was found that a vaccine containing 0·2-0·3% formalin gave the best results, and that after incubation for two days it had lost its virulence, but not its immunizing properties. Each organism tested was capable of producing a vaccine with specific immunizing properties. No cross-immunity existed between *Cl.c.* and *Cl.s.*, but a vaccine prepared from the former protected against *Cl. oedematiens*, whilst a vaccine prepared from "*B. bradsot*" though affording no protection against *Cl.o.*, did protect against some strains of *Cl.c.*—J. A. Nicholson.

Wolters, K. L., & Dehmel, H. (1938). Ueber den Verlauf der aktiven und aktiv-passiven Immunität bei Tetanus. [**Active and Active-Passive Immunity to Tetanus**].—*Z. InfektKr. Haustiere.* **53.** 140-147. 4 tables. [13 refs.]

Using alum-precipitated toxoid, either together with, or without, antiserum, a high level of antibody content could be maintained in the blood of g. pigs for at least six months after the second dose of toxoid. In the case of two g. pigs in which 0·5 c.c. of toxoid had been injected six months previously, a test dose of tetanus spores had no effect. W. states that a dose of toxoid after six months will cause the antitoxic value of the serum to return to the previous high level. In ten horses, three injections of 10 c.c., 10 c.c., and 20 c.c. of toxoid, with time intervals of three months between the first and second, and five months between the second and third injections, gave a response varying from 20 to 110 international units per c.c.—P. S. Watts.

Stubenrauch, L. (1938). Zur epiduralen Antitoxinverabreichung bei Tetanus. [**Treatment of Tetanus by Antitoxin Epidurally**].—*Wien. tierärztl. Mschr.* **25.** 278-279.

A clinical case of tetanus in a horse was cured by the epidural injection of 200 units of antiserum daily for 12 days, followed by 100 units daily for three days. A further case treated in the early stages responded to three injections of 200 units and two of 100 units.—P. S. Watts.

GEURDEN, L. M. G., & WILLEMS, A. E. R. (1938). Kuikensterfte na sexen. **[Transmission of an Anaerobic Infection to Chicks during Sex Differentiation].**—*Vlaam. Diergeneesk. Tijdschr.* **7.** 47-49. [2 refs.] [English, French and German summaries].

After a professional " chicken sexer " had done his work on a farm, 70% of the chicks died. The authors consider that anaerobic organism isolated from the carcasses were the cause of death, although they were not pathogenic when inoculated into rabbits, g. pigs and hens. The bacteriological work was not completed.—JAC. JANSEN (UTRECHT).

GOYAL, R. K. (1938). **A Serological Study of the Actinomyces.**—*Indian J. med. Res.* **25.** 843-846. [14 refs.]

G. employed the complement-fixation test to study the antigenic structure of the *Actinomyces* and also of certain other bacteria. The strains of *Actinomyces* employed were unemulsifiable, and a methylic extract of the organism was used therefore as antigen.

The sera studied included those prepared against both rough and smooth strains of avian and mammalian tubercle bacilli, against paratuberculosis bacilli [acid-fast organisms other than *Mycobacterium tuberculosis* or **M. paratuberculosis* (the bacillus of Johne's disease)] again including both smooth and rough strains, against actinomyces, and against *Corynebact. diphtheriae.*

G. was able to demonstrate an antigen common to *Actinomyces*, *Corynebacterium* and *Mycobacterium.* This antigen was absent from bacteria unrelated to *Actinomyces* on a microbiological basis. He concludes that the *Actinomyces* should be included within the schizomycetes.—L. E. HUGHES.

TUNNICLIFF, E. A. (1938). **An Improved Medium for the Storage of** *Actinomyces* [*Fusiformis*] *necrophorus* **Cultures.**—*J. infect. Dis.* **63.** 113-116. 1 table. [2 refs.]

T. recommends a modification of Haslam's beef-brain-liver broth for the storage of *F.n.* The medium maintained the viability of nine strains for 460 days at room temperature and seven of ten strains, subcultured at three-monthly intervals, retained their pathogenicity for 1-7 years.—R. O. MUIR.

BAKER, J. A. (1938). **Light as a Factor in the Production of Pigment by Certain Bacteria.**—*J. Bact.* **35.** 625-631. 2 tables. [1 ref.]

B. describes a number of strains of acid-fast bacilli (including an avian strain of tubercle bacilli) which formed pigment in the presence of light and were devoid of pigment when cultivated in darkness.

Brief exposure to sunlight and ultra-violet light, followed by incubation in darkness, also gave rise to pigment production. B. considers this a vital phenomenon, because organisms killed by heat did not develop pigment when exposed to light, pigment was not formed if cultures after exposure to light were kept at 4°C., and alcoholic extracts of unpigmented organisms (the pigment being soluble in alcohol) did not develop pigment after exposure to light.—D. L. HUGHES.

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* In future this organism will be called *Mycobacterium johnei* in this *Bulletin.*

DISEASES CAUSED BY PROTOZOAN PARASITES

FRENCH, M. H. (1938). **Studies in Animal Trypanosomiases. IV. The Effect of *Trypanosoma congolense* and *Trypanosoma brucei* on Some Inorganic Blood Constituents.**—*J. comp. Path.* **51.** 119-127. 8 tables. [18 refs.]

Continuing his studies on the biochemical changes caused by *Tryp. brucei* and *Tryp. congolense* in cattle, sheep and donkeys [*V. B.* **9.** 11.], F. records that the inorganic phosphorus content of the blood was not changed during infection, whereas the blood calcium, although unaltered in several cases, decreased in others. The potassium content of the blood fell until death or the disease crisis, whilst the sodium and chlorine contents rose. These latter changes are ascribed to the anaemia which produced a lowered cell content and an increase of blood plasma, the cells being rich in potassium and the plasma in sodium and chlorine.—U. F. RICHARDSON.

SPRINHOLZ-SCHMIDT, A. J. (1938). Infection simultanée par le *Trypanosoma theileri* et le *Theileria sergenti* en extrême-orient. [**Mixed Infection of Cattle with *Tryp. theileri* and *Th. sergenti* in the Far East**].—*Ann. Parasit. hum. comp.* **16.** 117-120.

The author discusses the records of the detection of *Tryp. theileri* in various countries and the evidence as to its pathogenicity, which he considers is probably slight. He points out that the trypanosomes can rarely be detected in the blood of infected cattle unless the animals are depressed by the injection of various substances, by bleeding, or by other diseases. The appearance of *Tryp. theileri* in large numbers in the peripheral blood of a cow during the course of a *Th. sergenti* [*Th. annulata*] infection is recorded. The animal exhibited symptoms which were typical of the theileria infection.—U. F. RICHARDSON.

VAN SACEGHEM, R. (1938). L'immunisation des bovidés contre la trypanosomiase. [**Immunization of Cattle against Trypanosomiasis**].—*Bull. Soc. Path. exot.* **31.** 296-298. [Also appeared in *Bull. agric. Congo belge.* **29.** 141-142].

The author again draws attention to the method of immunizing cattle to *Tryp. congolense* by injecting them as calves under one month old. He claims that subsequent reinoculation with infected blood fails to produce further infection, and that immunized animals resist disease in areas in which the infection is transmitted by *Stomoxys*. He has not been able to test the value of the immunity in tsetse areas, and asks that other workers who have the opportunity should do so.—U. F. RICHARDSON.

MESNIL, F., PÉRARD, C., & PROVOST, A. (1938). Recherches expérimentales sur un trypanosome des ruminants de la Martinique. [**Research on a Trypanosome of Ruminants from Martinique**].—*Bull. Soc. Path. exot.* **31.** 377-381. 1 fig. [6 refs.]

The authors record investigations into a strain of trypanosome from Martinique which resembled *Tryp. vivax* both morphologically, and in that it was powerless to infect any of the small laboratory animals. The Martinique trypanosome appeared to be pathogenic to goats, but had little pathogenicity for sheep and horses. In the horse it caused a mild febrile reaction and urticarial symptoms. The symptoms subsided in two months and the trypanosomes disappeared from the blood. A year later the horse was reinfected with an African strain of *Tryp. vivax*, which caused death in six weeks. It is suggested that the low pathogenicity for sheep and horses distinguishes the organism here recorded

from *Tryp. vivax*. [Strains of *Tryp. vivax* from different parts of Africa appear to vary considerably in their pathogenicity].—U. F. Richardson.

Christensen, J. F. (1938). **Occurrence of the Coccidian *Eimeria bukidnonensis* in American Cattle.**—*Proc. helminth. Soc. Wash.* **5.** 24. [1 ref.]

A sample of bovine faecal material from the Veterinary College at Cornell University was found to contain pyriform oocysts of a brown colour, opaque in appearance, and with a thick wall. This description corresponds exactly to Tubangui's description of *E.b.* oocysts from the Philippine islands; the only difference is that the American specimens were much smaller.

Holmes, C. E., Herrick, C. A., & Ott, G. L. (1937). **Studies in Coccidiosis in Chickens. Calcium Carbonate Additions and Coccidia.**—*Poult. Sci.* **16.** 335-339. 5 tables. [4 refs.]

A series of three chick feeding experiments, with a basal chick mash used alone, and with the same plus 3% and 6% chick size oyster shell, are recorded to show the influence of calcium carbonate upon the susceptibility of chicks to coccidiosis. In the basal ration the Ca : P ratio was 1 : 1·07; with 3% and 6% oyster shell added it was 1 : 0·74 and 1 : 0·354 respectively.

The chicks of two such variously fed lots were tested at two weeks of age, and in the other experiment at four weeks of age, with approximately 200,000 sporulated oocysts of *Eimeria tenella*.

Percentage death rates from coccidiosis for the chicks fed on the basal ration averaged 46·2, on the 3% oyster shell ration, 53·6, and on the 6% oyster shell ration, 71·3.

An attempt to keep the Ca : P ratio the same as in the basal ration by adding sufficient disodium phosphate with the oyster shell was unsuccessful on account of the impalatability of the mixture, leading to death of the chicks from starvation.

—C. V. Watkins.

Toumanoff, C. (1937). Persistance des sporozoites du paludisme chez *A. minimus* après plusieurs prises de sang sur les animaux. [**Persistance of Sporozoites of Malaria in *Anopheles minimus* after Several Feeds on Animals**].—*Bull. Soc. Path. exot.* **30.** 765-767. [2 refs.]

T. captured a large number of *A.m.* in Cambodia and kept them alive by allowing them to feed on cattle and buffaloes. He states that some of the insects, already infected with malaria sporozoites before feeding on the animals, still carried the infection after many meals on them.—J. E.

Brumpt, E. (1938). Le paludisme des buffles, existe-t-il en Indochine et peut-il fausser les indices oocystiques et sporozoitiques établis dans diverses régions asiatiques ? [**Possible Complications in Surveys of the Malarial Infection Rate in Mosquitoes in Indochina, Due to the Existence of Buffalo Malaria**].—*Bull. Soc. Path. exot.* **31.** 479-483. 1 fig. [8 refs.]

B. criticizes the conclusion of Toumanoff [above] that oocysts and sporozoites of human malaria could persist for 25 days in *Anopheles minimus* in Cambodia. He points out that the oocysts described represented forms two or three days old, and, as the mosquitoes had been fed on a buffalo, the oocysts may have been those of *Plasmodium bubalis*. He points out that plasmodium infection of the buffalo is difficult to detect as the parasites are never numerous in the peripheral blood, and suggests that infection could be demonstrated by the sub-inoculation of newborn calves. As it seems buffalo infection may be more prevalent in Asiatic

countries than supposed, it is important that further research be undertaken, since, if the intermediate host proves to be a species of *Anopheles*, then mosquito surveys undertaken to ascertain the incidence of infection with human malaria may be complicated by infection with the buffalo parasite.—U. F. Richardson.

Džunkovski, E. (1937). Pregled radova o Balfourovim granulama u vezi sa novim nazivima ovog parazita. [**The Identity of Balfour Bodies**].—*Jugoslov. vet. Glasn.* **17.** 315-321. 1 fig. [Numerous refs.] [German summary].
This article was also published elsewhere [see *V. B.* **8.** 428].
—B. Oswald (Križevci).

Niimi, D. (1937). **Studies on Blackhead. II. Mode of Infection.**—*J. Jap. Soc. vet. Sci.* **16.** pp. 183-239 of pt. 1. 3 figs. on 1 plate, 9 tables. [9 refs.] [In Japanese : abst from English summary pp. 23-26 of pt. 2]. [See also *V. B.* **6.** 801].
A discussion of work which is in accordance with well known facts.—J. E.

Blumenberg, W. (1937). Ueber die Weilsche Krankheit als Laboratoriums- und Stallinfektion. [**Human Leptospirosis Contracted from Laboratory Animals and Cages**].—*Zlb. Bakt. I.* (*Orig.*). **140.** 100*-104.*
Three cases of Weil's disease in laboratory workers are recorded in which infection was believed to have been contracted by handling experimental rats and their cages. It was uncertain whether infection was percutaneous, by ingestion, or by the conjunctiva. In one case the complement-fixation and agglutination tests were negative, but organisms were detected P.M. in kidney sections. It is suggested that contact between experimental and wild rats should be prevented, rat attendants should wear goggles and rubber gloves, and the entry of unauthorized persons into the rat house should be prohibited. In the discussion which followed, infection of laboratory workers was also recorded from Heidelberg, Berlin, Marburg and Munich, the infection being traced in some cases to white rats, with no evidence that wild rats had been involved.—U. F. Richardson.

Poncet, A. (1938). Spirochète du dromadaire. [**A Spirochaete of Dromedaries**].—*Bull. Soc. Path. exot.* **31.** 478-479. 1 fig.
P. detected a small spirochaete in a blood film of a dromedary from Touggourt. The organism is described as being 7·5μ in length, having three turns in the spiral, and staining well by Giemsa. No information is given as to its pathogenicity.
—U. F. Richardson.

Wilson, I. D., & MacDonald, Ruth. (1938). **Some Notes on Sarcosporidia in Virginia.**—*J. Parasit.* **24.** 249-250. [4 refs.]
Of 34 cow hearts examined, 30 showed numerous cysts. Only eight out of 27 sheep hearts were infected. The neck muscle of a horse showed similar cysts.
The heart muscle of 29 calves 6-8 weeks old failed to reveal any cysts. The authors take this negative finding to confirm the accepted view that young animals which have not been to pasture are free from infection. The cysts in the cattle, sheep, and horse are described.—D. D. Ogilvie.

Sabin, A. B. (1938). **Isolation of a Filtrable, Transmissible Agent with " Neurolytic " Properties from Toxoplasma-Infected Tissues.**—*Science.* **88.** 189-191. [1 ref.]
A filtrable agent (size 314-360$m\mu$) was isolated from the brains of mice affected with toxoplasma after the tissues had been frozen at -80°C. in order to kill parasites,

The disease produced was characterized by choreiform symptoms, and was only occasionally fatal. It was readily transmitted in series. The chief lesion was an acute necrosis and almost complete dissolution of the caudal part of the cerebellum.

The infective agent was found in most of the organs, but not in the brain. This observation suggests that the lesions in the brain were produced by some substance formed by the action of the transmissible agent on various cells of the body. Mice which had recovered were resistant to reinoculation. The agent was not found in the organs of mice free from toxoplasma infection.—R. E. GLOVER.

MACHATTIE, C. (1938). **Notes on Two Cases of Naturally Occurring Toxoplasmosis of the Dog in Baghdad.**—*Trans. R. Soc. trop. Med. Hyg.* **32.** 273-276. 16 figs. on 1 plate. [15 refs.]

A record of two fatal cases in street dogs of Baghdad. The chief symptoms were emaciation, anorexia, and dyspnoea. Autopsy revealed numerous small necrotic foci in the lungs and liver. Smears showed that the parasites were most numerous in the lungs, where schizont-like structures appeared, but single forms and binary fission types were found in the liver, spleen, submaxillary lymph nodes, heart blood, and muscle. No parasites were observed in smears from the brain, spinal cord, or kidneys. The general features of the parasites agreed with the accepted description of them [NICOLLE and MANCEAUX (1909)]. Attention is directed, however, to regularly occurring, pear-shaped masses of parasites which closely resembled schizonts, and which occurred only in the lungs. Neither in smears nor in sections, however, was proof of schizogony definitely apparent; nor does it seem likely that this process occurs, since reproduction by binary fission is definitely established.

The observation that toxoplasmosis is of seasonal occurrence, and appears during the coldest period of the year, is supported by the recording of these cases in March after a very cold winter.—D. D. OGILVIE.

DISEASES CAUSED BY VIRUSES

PSCHORR. (1938). Beiträge zur veterinärpolizeilichen Bekämpfung der Maul- und Klauenseuche. [**Veterinary-Police Control of Foot and Mouth Disease**]. —*Münch. tierärztl. Wschr.* **89.** 7-11.

P. considers that two things are necessary in the control, *viz*, rapid action and conscientious co-operation. He deprecates keeping owners in a continuous state of apprehension, and considers it preferable to go in for extensive publication of symptoms, etc, as soon as the disease appears.

He deals with possible methods of transmission of the disease, and stresses the importance of seasonal visitors from infected areas, and the inadvisibility of rat extermination by poisoning and by the use of strong-smelling liquids, both of which only force the rats to migrate from infected buildings to clean ones. Cats should be confined during the breeding season, and care should be taken to see that hauliers from infected areas are not allowed to procure " return loads " from farms. P. also discusses the organizations which he considers should be kept in readiness for dealing with an outbreak. There is no new information.—G. D. M.

FRENKEL, H. S. (1938). Maatregelen getroffen in verband met de heerschende mond- en klauwzeerepizootie 1937. [**Control Measures for the Foot and Mouth Disease Outbreak in Holland in 1937**].—*Tijdschr. Diergeneesk.* **65.** 72-76.

At the beginning of 1937 odd outbreaks of F. & M. disease were observed;

the first important outbreak in the recent epizootic was in July. The virus was cultivated in bovine embryo tissue cultures, and when 24 oxen were infected with the culture virus, a serum of high titre was obtained. After two or three bleedings reinoculation was necessary to maintain the high titre of the serum. To provide large quantities of serum for practitioners, convalescent animals had to be used. —Jac. Jansen (Utrecht).

Kanyó, B., & Gabor, O. (1938). Komplementbindungsversuche in einem Fall von Maul- und Klauenseucheinfektion beim Menschen. [**Complement-Fixation Test in a Case of Foot and Mouth Disease in Man**].—*Z. Immun-Forsch.* **92.** 20-26. 2 tables. [15 refs.]

The authors record a case of F. & M. disease in a human being, in which they carried out c.-f. tests with his blood serum during convalescence, using Ciuca's technique [(1928). *J. Hyg.* **28**]. An aqueous suspension of ground vesicle shreds from an infected g. pig was used as the antigen, the virus strain being the same " O " type which had previously been isolated from the human patient. Moderately strong complement fixation was obtained both with the human serum and with serum of infected g. pigs. The authors consider that the c.-f. test is specific in F. & M. disease.—J. E.

I. Bennetts, H. W. (1937). **The Use of the Complement-Fixation Test in the Control of Bovine Pleuro-Pneumonia.**—*Aust. vet. J.* **13.** 178-183. 1 table. [6 refs.]

II. Turner, A. W., & Campbell, A. D. (1937). **A Note on the Application of the Complement-Fixation Test to the Control of Bovine Pleuro-Pneumonia.** —*Ibid.* 183-186.

I. B. describes the application of the c.-f. test [see II] in an attempt to eradicate contagious bovine pleuro-pneumonia from a herd of 92 cattle. The slaughter of reactors to a series of six tests (monthly) failed to eradicate the disease. This was not due to false results, as P.M. examination of all the animals provided almost complete confirmation of the serological tests. Failure was attributed to the long intervals between tests and the long incubation period of the disease.

II. The authors discuss the practical difficulties described by Bennetts [above] and admit that, although in some outbreaks the application of this serological test has facilitated the eradication of the disease from unvaccinated herds, it would probably be too irksome in others. They agree that the length of the incubation period in some animals introduces the greatest difficulty, and consider it safe to assume that the maximum period would not exceed 90 days. They suggest that the more practicable method of controlling the disease in dairy herds is as follows :– (a) quarantine of the infected property and those in contact ; (b) slaughter of clinical cases ; (c) collection of sera for testing, followed by immediate vaccination, and observations on the extent of tail reactions ; (d) the removal and slaughter of positive and suspicious reactors, and (e) retest of survivors eight weeks after vaccination. The results of the retest [in (e)] should be examined and any reaction which is strongly positive with a serum dilution of 1 : 320 or greater will probably be due to natural infection and not to tail inoculation. " Carriers " may thus be eliminated from amongst the " clean " and now actively immunized animals.—T. S. Gregory.

Beck, C. E., & Wyckoff, R. W. G. (1938). **The Antigenic Stability of Western Equine Encephalomyelitis Virus.**—*Science.* **88.** 264. [2 refs.]

G. pigs vaccinated subcutaneously with two strains of western equine ence-

phalomyelitis virus, prepared from brains of horses that died in the 1933 outbreak, proved immune to an intracerebral test inoculation two weeks later with 100-1,000 M.L.D. of the homologous strains. They were also immune to strains from widely differing sources, *viz* :– (1) g. pig-passaged virus from the 1933 brains ; (2) the same virus after 60 egg embryo passages ; (3) mouse-passaged virus from a 1933 brain, and (4) 1937 field-virus from Iowa and Texas, after several g. pig passages.

The authors conclude that transfer to animals other than horses does not alter the antigenic structure of the western strain of the virus, that the disease is substantially the same in the different districts affected, and that vaccines are still effective against a strain of several years later than that from which they are made.

I. Pool, W. A. (1937). **Sir John M'Fadyean's Work on " Louping-Ill ".**—*J. comp. Path.* **50.** 393-394.

II. Stewart, W. L., & Ponsford, Phyllis A. (1937). **Lamb Diseases Coincident with Louping-Ill.**—*Ibid.* 395-400.

I. A brief account of work already published [*V. B.* **1.** 57 and 129].

II. Investigations were conducted in Northumberland during 1936 and 1937 on the heavy losses amongst lambs from alleged " louping-ill ". Vaccination against true louping-ill proved to be of no value, and of 99 dead lambs examined, louping-ill was suspected in only five ; no attempt was made, however, to recover virus. Another 50 lambs were affected with pyaemia, which would appear to be the main factor concerned in the death rate. In 1937, 110 lambs were examined. Sixty-eight of the deaths were due to pyaemia and *Clostridium welchii* Type D infection, either separately or combined ; in 23 the cause of death was indefinite, and a number of these may have been due to true louping-ill. This disease is, therefore, of no very great significance in the lamb mortality in the districts examined, the majority of deaths being due to pyaemia directly or indirectly and to the entero-toxaemic group of diseases.—A. Wilson Taylor.

Laszló, H. (1937). A sertéspestis elleni szimultánoltás az ú.n. oltási telepeken. [**Simultaneous Inoculation against Swine Fever at the So-Called Inoculation Settlement**].—*Állatorv. Lapok.* **60.** 138-142. 5 figs., 1 table. [4 refs.]

The Rumanian veterinary-police regulations state that, on farms where complete isolation of inoculated animals is impossible, simultaneous inoculation against S.F. should only be carried out when the surrounding district is already infected. To allow of active immunization of piglets against S.F. at any desired time, certain villages in Rumania have erected large isolation buildings, complying with the hygiene regulations where each individual farmer living in the neighbourhood may send his pigs, there to be kept under veterinary-police supervision for 30 days after simultaneous inoculation.—G. Sályi (Budapest).

Dobson, N. (1937). **Pox in Pheasants.**—*J. comp. Path.* **50.** 401-404. [2 refs.]

D. describes an outbreak of pox in pheasant chicks 4-10 weeks old. It was possible to infect pheasants, fowls and pigeons artificially with material from the natural cases of the disease. Liver and bone-marrow from artificially infected pheasants were infective for pigeons after filtration through a Seitz filter.

Contrary to the usual findings, good lesions were produced in both fowls and pigeons. On further passage in fowls the lesions increased in size, but virus from the 12th passage in fowls produced only slight lesions when inoculated into pigeons. Pheasants inoculated with pigeon pox virus showed a normal reaction similar to that in fowls, and a month later such inoculated pheasants were resistant to virulent pox virus from pheasants.

D. concludes that this virus was actually neither a fowl nor a pigeon pox virus, but appeared more nearly related to the latter.—D. L. Hughes.

Seifried, O. (1937). Einfluss von Virusvirulenz und Infektionsart auf den anatomischen Charakter der sog. Laryngotracheitis der Hühner. **[The Influence of the Method of Infection and the Virulence of the Virus on the Pathological Character of Avian Laryngotracheitis].**—*Z. InfektKr. Haustiere.* **52.** 108-123. 4 figs. [6 refs.]

An outbreak in pheasants was found to be due to the virus of fowl laryngotracheitis. The virus was passaged in fowls. From the seventh passage there was a shortening in the incubation period, and at the same time the virus caused laryngotracheitis in addition to rhinitis. It is suggested that clinically there is a nasal, a laryngotracheal and a mixed form of affection due to the virus. The nasal form usually occurs after artificial infection *via* the conjunctiva, and when numerous susceptible birds are kept together in a confined space. As the disease develops, the larynx and trachea become involved (the combined form), and the rhinitis ceases. Chronic rhinitis is very rare. The laryngotracheal form results from direct inoculation into the trachea, or indirectly as explained above. When the disease begins in the trachea, the nasal passages and the eyes do not usually become involved, but attenuated virus may cause rhinitis alone without complications.
—Sassenhoff (Munich).

Fraenkel, E. M., & Mawson, C. A. (1935). **Adsorption and Elution of the Rous Sarcoma Agent.**—*Brit. J. exp. Path.* **16.** 416-422. 4 tables. [13 refs.]

The authors succeeded in separating the infective agent from Rous sarcoma tissue by extraction for 30 minutes in a refrigerator with M/15 buffer phosphate followed by adsorption into Wilstätter alumina C or D. The most potent eluate was obtained when the adsorption was carried out at a pH of 7·5-8·4.—J. E.

Fraenkel, E. M., & Mawson, C. A. (1937). **Further Studies of the Agent of the Rous Fowl Sarcoma: A. Ultra-Centrifugation Experiments; B. Experiments with the Lipoid Fraction.**—*Brit. J. exp. Path.* **18.** 454-460. 1 fig. on 1 plate, 2 tables. [15 refs.]

A. Describes experiments which show that there is no relationship between the number of elementary bodies present and the power of tumour formation. Eluates containing few elementary bodies were rich in agent, leading the authors to conclude that these bodies do not wholly represent the agent.

B. Describes experiments suggesting that the agent is of a chemical nature, and points out that after extracting with acetone and carbon tetrachloride the agent is retained in the residue and some inhibitor appears to be present in the extract.—J. E. Wilson.

Pentimalli, F., & Schmidt, G. (1935). Ueber das Verhalten der Phosphorfraktionen in Blutplasma sarkomkranker Hühner. **[The Phosphorus Content of the Blood Plasma of Hens with Sarcoma].**—*Biochem. Z.* **282.** 62-73. 4 tables. [5 refs.]

Twenty-nine fowls were infected by inoculation of virulent material into the wing vein; nine controls were also used. The blood for P estimation was obtained from the carotid artery and from the wing vein of the fowls. The blood collected from the wing vein of the affected fowls had consequently come straight through the tumour. The blood was examined for total P, acid-soluble P and lipoid P.

In general it was found that the total blood P of sarcomatous fowls was 30%

greater than in the normal fowls, that protein P was present in the affected, but not in the normal fowls (by deduction from the fact that the totals of acid-soluble P and lipoid P exceeded the total P by the method of estimation used), and that acid-soluble P was obtained only from venous blood coming from normal muscles and not in that from sarcomatous tissue.—J. E.

NYFELDT, A. (1937). Hønse-leucoserne. [**Fowl Leucosis**].—*Skand. Vet Tidskr.* **27.** 509-577. 10 figs., 1 plate, 5 tables. [Numerous refs.] [English summary].

The globulin fraction of citrate plasma is richer in agents causing myeloblastosis than the albumin fraction. A " strain " of myeloblastosis was transmitted through 14 generations without producing erythroblastosis or lymphatic leucosis. Myeloblastosis of hens is considered to be analogous to human myeloblastosis from the haematological and histopathological aspects.

Lymphatic leucosis is the most common form (50-60% of cases examined) and is analogous to human lymphatic leucosis. In most cases it is aleucaemic, but typical leucaemic cases may also be seen. It must be looked upon as transmissible, though N. does not consider this to have been confirmed experimentally.

Erythrosis (erythroblastosis) shows a very varying clinical picture, with acute leucaemic forms at one extreme and chronic aleucaemic forms (the so called anaemic forms) at the other extreme, with transitional forms between.

Inoculation into chickens of material from anaemic " aleucaemic " erythrosis often produced typical acute " leucaemic " erythrosis.

—H. C. BENDIXEN (COPENHAGEN).

BULL, L. B., & DICKINSON, C. G. (1937). **The Specificity of the Virus of Rabbit Myxomatosis.**—*J. Coun. sci. industr. Res. Aust.* **10.** 291-294. 1 table. [4 refs.]

Many experiments by workers outside Australia have provided evidence that this virus is capable of producing disease only in the European rabbit (*Oryctolagus*). The authors confirmed and extended this evidence by inoculating 124 animals, including a number of native marsupials, reptiles and birds. None of these animals developed any symptoms of disease.—T. S. GREGORY.

LEDINGHAM, J. C. G. (1937). **Studies on the Serological Inter-Relationships of the Rabbit Viruses, Myxomatosis (Sanarelli, 1898), and Fibroma (Shope, 1932).**—*Brit. J. exp. Path.* **18.** 436-449. [8 refs.]

L. describes the material and the methods he has employed in the examination of the sera of rabbits for agglutinins against the elementary bodies of these two diseases.

Results of the examination of the sera of five rabbits recovered from myxoma and two with fibroma indicated the presence of agglutinins against myxoma elementary bodies. These agglutinins were not present in the sera of a normal rabbit. L. demonstrated the presence of anti-myxoma agglutinins as early as the third day after inoculation with fibroma. This may explain the early resistance to myxoma offered by fibroma-infected rabbits.

Enquiries into the course taken by agglutinins in individual rabbits studied over long periods indicated that agglutinin development for myxoma elementary bodies was the chief response both to myxoma and fibroma infection, while significant titres for fibroma were not invariably encountered. Studies were also made on the development of agglutinins after the inoculation of virulent myxoma virus and its neuro-myxoma variant, and on the further development of agglutinins to

reinoculation of myxoma-recovered fibroma-infected rabbits. Agglutination-absorption experiments with antisera against the elementary bodies of these two diseases further emphasized the antigenic affinity of these two viruses.

L. discusses the theory of the transformation of fibromato-myxoma virus in the animal body.—L. E. Hughes.

I. Ahlström, C. G. (1938). **The Histology of the Infectious Fibroma in Rabbits.**—*J. Path. Bact.* **46.** 461-472. 7 figs. on 2 plates, 1 table. [12 refs.]

II. Ahlström, C. G., & Andrewes, C. H. (1938). **Fibroma Virus Infection in Tarred Rabbits.**—*Ibid.* **47.** 65-86. 11 figs. on 4 plates, 1 table, 1 chart. [18 refs.]

III. Thompson, R. L. (1938). **The Influence of Temperature upon Proliferation of Infectious Fibroma and Infectious Myxoma Viruses in vivo.**—*J. infect. Dis.* **62.** 307-312. 2 tables. [9 refs.]

I. The Shope fibroma appears 3-5 days after inoculation with infective material; in this instance, bacteria-free emulsions of testes were used. Ten to 18 days after injection the tumour had reached its maximum, and had completely disappeared after a further 7-14 days. Positive results were obtained after intracutaneous, epidermal and intramuscular inoculation, and in one case, which terminated fatally due to involvement of the bowel, after intraperitoneal inoculation. Histologically, the tumour displays both inflammatory and neoplastic features. The early stages are mainly granuloma-like, but later the neoplastic features predominate. The fibroma cells originate from fibroblasts, perivascular histiocytes, and endothelial cells, and show characteristic basophilic cytoplasmic inclusions increasing in size and number with the tumour, while the epithelium overlying the intracutaneous tumour shows eosinophilic granules and sometimes hyperplasia. Regression occurs primarily through necrosis, but also by resorption.

II. The intramuscular inoculation of tar into fibroma-infected rabbits caused marked delay in the regression of the tumour (OA strain). In some cases the tumours grew progressively, resembling true neoplasms much more closely than those produced in the untreated rabbit. If the virus was given intravenously, generalized fibromatosis usually developed and sometimes ended fatally. A single injection of tar was sufficient to produce the above results, but had no apparent effect on the IA strain of the virus, or on vaccinia virus.

III. The maintenance of the skin of rabbits at a temperature approximating to that of the internal organs inhibited the development of the Shope fibroma (OA strain). This is given as a possible explanation of the fact that this virus normally affects only the superficial tissues. The same effect was obtained, in a lesser degree, with infectious-myxoma virus, which is antigenically related to the fibroma virus. Animals that did not develop active infection also failed to develop immunity.—A. Wilson Taylor.

Webster, L. T. (1938). **Japanese B Encephalitis Virus; its Differentiation from St. Louis Encephalitis Virus and Relationship to Louping Ill Virus.**—*J. exp. Med.* **67.** 609-618. 4 figs. on 2 plates, 3 tables. [Numerous refs.]

W. states that Japanese B encephalitis virus will infect mice, monkeys and sheep, but that, according to reactions obtained in different species of animals, it differs from the St. Louis virus, though somewhat similar to that of louping-ill. It is serologically distinct from both, however. The method of spread of these and of other virus infections of the central nervous system is discussed, together with the evidence for and against infection *via* the upper respiratory and subcutaneous routes, but no conclusion is reached.—A. Wilson Taylor.

KREIS, B. (1937). La Maladie d'Armstrong. Chorio-méningite lymphocytaire. Une nouvelle entité morbide ? [**Armstrong's Disease (Lymphocytic Choriomeningitis)**].—*Thesis, Paris.* pp. 160. 14 figs. [Numerous refs.]

During research on this disease, fowls, pigeons and cats were found to be insusceptible.—J. E.

I. DERRICK, E. H. (1937). "**Q" Fever, a New Fever Entity : Clinical Features, Diagnosis and Laboratory Investigation.**—*Med. J. Aust.* Aug. 21st. 281-299. 14 figs., 13 tables. [4 refs.]

II. BURNET, F. M., & FREEMAN, Mavis. (1937). **Experimental Studies on the Virus of "Q" Fever.**—*Ibid.* 299-305. 6 text figs., 3 figs. on 1 plate, 1 table. [3 refs.]

I. An investigation of cases of fever occurring among workers in a large meat works led D. to describe a fever entity of a type not previously differentiated, and which he provisionally named "Q" fever. This fever differed clinically in many respects from the usual typhus fevers, and the serum of patients did not agglutinate any of the usual range of "O" proteus suspensions. In no case did the disease prove fatal. G. pigs reacted to inoculation with blood or urine from patients and were thereafter immune. As the nine cases investigated occurred in meat workers or dairy farmers, an animal reservoir of infection, with a blood-sucking parasite as a vector, was suspected. Preliminary attempts to find such a reservoir using material from cattle, sheep and pigs were not successful.

II. Working with material submitted for investigation by DERRICK [above], the authors were able to show that the mouse is susceptible to "Q" fever, and to demonstrate the presence of large numbers of rickettsial organisms in the spleens of infected mice. Semi-purified suspensions of these organisms were agglutinated by sera from infected g. pigs and monkeys and from human patients.—T. S. G.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

NATVIG, L. R. (1937). Ueber die Differentialdiagnose der Larven von *Hypoderma bovis* und H. *lineatum*. [**On the Differentiation of the Larvae of *H.b.* and *H.l.***]—*Festschr. Bernhard Nocht, 1937.* pp. 386-393. 4 figs. [Numerous refs.] Hamburg : Friederichsen de Gruyter & Co.

Hypoderma species are fairly common in the southern parts of Scandinavia, and were previously believed to be principally *H.b.* A critical revision of some of the Norwegian collections showed that most of the material was wrongly named and indicated that *H.l.* is the commonest species, both in Norway and Sweden. Similarly, in Finland and Denmark, investigation revealed *H.l.* to occur more commonly than was previously believed.

Examination of the distinguishing larval characters of the two species, as given by LAAKE in the U.S.A., revealed some slight differences of degree between the Scandinavian and American forms, particularly in respect to the stigmal plates. Tables are given of the range of variation found in the number of stigmal discs in Norwegian and American forms of the two species.—J. MACLEOD.

MLINAC, F., & OSWALD, B. (1937). Početna istraživanja o otrovu iz jaja krpelji Boophilus calcaratus balcanicus (Minning) ispitanom na zamorcima. [**Preliminary Studies on the Poison Contained in the Eggs of the Tick *B.c. balcanicus* (Minning), Tested on Guinea Pigs**].—*Vet. Arhiv.* **7.** 277-297. 2 figs., 2 tables. [Numerous refs.] [English summary].

Because of the heavy losses caused by tick paralysis (so-called "shimteera"

disease in Yugoslavia) [*V. B.* **7.** 334.], the authors arranged a systematic investigation of all the species of ticks occurring in that country. Their earlier work dealing with *Hyalomma savignyi* (later re-identified as *H. scupense*) [*V. B.* **7.** 535.], was continued in their study of *B.c. balcanicus*. REGENDANZ and REICHENOW'S crushed-eggs method [*V. B.* **7.** 535.], modified by the authors, was used again. It was ascertained that a strong paralysing poison is present in the eggs of *B.c. balcanicus* in almost the same strength as that found in *Hyalomma*, since 0·5 c.c. of standard extract (equivalent to 0·1 g. eggs) administered subcutaneously in the neck, caused tick paralysis in g. pigs, with a fatal outcome, by the 4th or 5th day. The poison is thermolabile; it is not destroyed by either 0·2% HCl, or 0·1% NaOH, and is not digested by pepsinase or ptyalin.

CLARKE, C. H. D. (1937). **American Dog Tick, *Dermacentor variabilis* Say, in Ontario.**—*Canad. Field Nat.* **51.** 99. [4 refs.] [Copied *verbatim* from *Rev. appl. Ent.* **26.** 285].

Dermacentor variabilis, Say, was taken on a dog in Ontario in 1935. There is apparently only one previous record of its occurrence in the Province.

MICHAELIS. (1936). Die Pferdelaus und ihre Bekämpfung. [**The Control of Horse Lice**].—*Z. Veterinärk.* **48.** 385-401 and 426-442. [Numerous refs.]

Lice are prevalent on army horses in Germany and are difficult to eradicate. The parasite, *Haematopinus equi*, has a life-cycle of 15 days' duration at an optimum temperature of 35°C. At a lower temperature, 12°C., the lice are stiff and inactive, and at temperatures over 50°C. they die. They cannot survive for longer than two days without food at their optimum temperature, but they can survive for seven days at a lower temperature.

Methods of killing lice are reviewed in detail. Killing agents include poisonous gases or vapours such as formalin, carbon monoxide, sulphur dioxide and hydrocyanic acid. Contact poisons include watery solutions containing sulphur, arsenic or tobacco, or black sulphur ointment, hydrocarbon oils or cresol. Fats and oils are also used with the object of suffocating the parasites. M. tested several preparations and mixtures and gives his results. A copper preparation called " cuprex " is recommended, also a mixture of three parts nicotine, 50 parts glacial acetic acid, and 1,000 parts " aqua fontana." Horses should be dressed with this at six-day intervals. Advice is also given on the treatment of harness, stable fittings and stables.—F. FREUDENBERG (HAMBURG).

BARTELS. (1937). Ueber die Ergebnisse der neuen Bekämpfungverfahren der Schafräude und künftig zu empfehlende Massnahmen. [**Results of a Campaign against Sheep Scab**].—*Dtsch. Tierärztebl.* **4.** 357-360. 1 table.

Sheep scab has been a notifiable disease in Germany since 1894, but until recently attempts to eradicate it had given unsatisfactory results. B. discusses the reasons for this. In 1936 an extensive campaign was initiated in heavily infected districts, and all flocks, whether infected or not, were passed through a sulphur-lime dip. Infected flocks were dipped twice, the second time not earlier than seven and not later than nine days after the first. Dipping had to be done soon after shearing when the wool was shorter than 1-2 cm. The results were apparently good, and it is added that the quality of the wool was much improved.—M. F. B.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

Carpano, M. (1938). Strongilosi gastro-intestinale degli ovini e caprini in Albania. [**Gastro-Intestinal Strongylosis of Sheep and Goats in Albania**].—*Azione vet.* **7.** 123-131. 4 figs. [4 refs.]

Gastro-intestinal strongylosis causes severe loss in sheep and goats during the summer on marshy land in Albania. The chief cause is *Haemonchus contortus* and the next important *Nematodirus filicollis*; these two parasites are described in detail, as well as the clinical condition. Other parasites found include *Fasciola hepatica*, *Dicrocoelium dendriticum*, *Tricocephalus affinis*, and *Eimeria faurei*.

For parasitic gastritis, one part of sodium arsenite to four parts of copper sulphate [the remedy used at Onderstepoort] are recommended, to be administered according to a dosage scale which ranges from 12 cg. for young lambs to 60 cg. for sheep over two years old. For fascioliasis, Venice turpentine in benzol (1 : 5) is recommended, the dose for sheep and goats being 3 c.c., in a capsule.

Hsü, H. F., & Chow, C. Y. (1938). **Studies on Helminths of Fowls. I. On the Second Intermediate Hosts of** *Metorchis orientalis* **and** *M. taiwanensis*, **Liver Flukes of Ducks. II. Some Trematodes of Fowls in Tsingkiangpu, Kiangsu, China.**—*Chin. med. J. Suppl.* No. 2. pp. 433-450. 6 figs. on 4 plates, 2 tables. [Numerous refs.] [In English].

I. The authors confirm *Pseudorasbora parva* as second intermediate host of *M.o.*, and add *Ps. rivularis*. They suggest there are final hosts of *M.t.* and *M.o.* other than fowls. Their experiments show that the latter are chiefly parasites of the gall-bladder, only a few being found in the bile ducts.

II. This article contains the authors' observations on specimens they examined of known species of trematodes, *viz* :– *Prosthogonimus japonicus*, *Metorchis orientalis*, *Metorchis taiwanensis*, *Opisthorchis tsingkiangpuensis*, *Hypoderaeum conoideum*, *Philophthalmus sinensis*, *Psilochasmus longicirratus*, and *Harmostomum gallinum*.—J. A. Griffiths.

Britton, J. W. (1938). **Studies on the Normal Variations in the Strongyle Egg Counts of Horse Feces.**—*Cornell Vet.* **28.** 228-239. 2 tables, 2 charts. [18 refs.]

Factors affecting the degree of infection may be divided into three groups :– (1) affecting the viability and development of eggs and free-living larvae (*i.e.*, environmental); (2) affecting transmissability of infective larvae, and (3) affecting parasitic development of larvae in the host. B. asserts that vast numbers of eggs and larvae are killed in winter or retarded in growth until spring or early summer. Retardation of larval development is not evident in faecal examinations until the spring, which is thus the best time for treating horses affected with strongyles. Spreading faeces in the open, especially in dry months, is quite lethal to all stages of strongyles; surviving parasitic forms are weak and inactive after even short exposure. Violent temperature fluctuations are most lethal to pre-parasitic stages; eggs and infective larvae are more resistant to freezing. Intermonthly fluctuations in the egg count were correlated with environmental conditions. Intermonthly variations in the egg output of horse strongyles are unrelated to atmospheric conditions and are possibly due to intermission of egg production. Artificial infection with strongyle larvae indicated that there is a period of five months between ingestion of larvae and maximum egg production of the females.—J. A. Griffiths.

I. Joling, K. F. (1938). Een voor Nederland onbekende parasiet in de conjunctivaalzak van het rund. [**A Parasite of the Conjunctival Sac of Cattle, hitherto Unknown in Holland** (*Thelazia*)].—*Tijdschr. Diergeneesk.* **65.** 671.

II. Baudet, E. A. R. F. (1938). *Thelazia gulosa*, een parasiet uit de conjunctivaalzak van het rund. [*Th.g.*, **a Parasite of the Conjunctival Sac of Cattle**]. —*Ibid.* 672-673. [4 refs.]

I. Pus found on the conjunctiva of both eyes of a three-year-old cow, was found to contain small male and female worms, believed to be *Thelazia*.

II. The four male and four female worms were found on examination to be *Th.g.* This was the first time this parasite had been found in the Netherlands. —Jac. Jansen (Utrecht).

Hošek, A. (1937). Habronemosa koní. [**Habronemiasis in Horses**].—*Voj. Vet.* **6.** 1-10. [Numerous refs.] [Abst. from English summary].

This is a short review, with no new information.—J. E.

I. Nolf, L. O., & Crum, J. D. (1937). **On the Production and Migration of the Larvae of** *Trichinella spiralis*.—Copied *verbatim* from *J. Parasit.* **23.** 574.

II. Nolf, L. O. (1937). **The Transplantation of Gravid** *Trichinella spiralis*.— *Ibid.* [Also *verbatim*].

I. An effort was made to determine quantitatively the time of production and the numbers of larvae produced by *Trichinella spiralis*. Rats were infested *per os* with 3,000 larvae each. Beginning on the fifth day after infection and on each day thereafter rats were autopsied and 1 c.c. samples of blood were obtained from the left ventricle, the right ventricle and the portal vein. These were drawn in Na citrate and the larvae concentrated by centrifuging. The results of these examinations showed a surprising absence of larvae in the blood. From some examinations a few larvae were found on the 6, 7, 8, 9, 10, 15, 17 and 18 days following infection but gave no indication of the total reproductivity of the worms in the intestine. In addition, the lymph cistern, the liver and the lungs were examined by dissection and pressing between slides. Larvae were not found by this method of examination.

II. Rats were infected with *Trichinella spiralis* and on the fifth day of infection a biopsy was performed and a single gravid female removed and transplanted to the intestine of an uninfected rat. Four such transplants were made. Two rats died from post-operative septicemia. The remaining two were autopsied six weeks later and the carcasses digested. From the one rat 1,112 larvae were obtained and the other rat yielded 14 larvae.

IMMUNITY

Plum, N. (1938). **On the Value of the Tuberculin Tests as Applied to Various Domestic Animals—Especially Cattle.**—*Skand. VetTidskr.* **28.** 97-105. [In English : Swedish summary].

In hens the intradermal tuberculin test in the wattles with avian tuberculin is considered of little value, as a great many of these birds fail to react on this test even if they are tuberculous.

P. speaks of horses in which no lesions could be found P.M. although the horses had given positive reactions to avian or bovine tuberculin.

In swine the intradermal test is considered of great value. Simultaneous tests

with bovine and avian tuberculin make it possible, with a fair degree of certainty, to decide *in vivo* the type of infection in the animal in question.

In the case of cattle, in Denmark as well as in several other countries, the tuberculin test forms the basis for eradication campaigns. Infections which cause false reactions are :–(1) the so-called "skin lesions", which have not yet been found in Denmark, and (2) Johne's disease, in which there is often a reaction with avian tuberculin, but seldom with bovine tuberculin. Differential diagnosis between Johne's disease and avian infection must be based on clinical symptoms ; in avian infection it is generally young animals which react, while in Johne's disease most reactors are older animals.

The differentiation between bovine and avian infections by means of the two types of tuberculin and simultaneous inoculations is discussed, and cases of infection with the human type are also mentioned. Diagnosis of human type infections can only be made " probable " in herds previously freed from TB. If it is proved that reactions are caused by bacilli of the avian or human type and the sources of infection are removed, the reacting animals will generally lose their hypersensitiveness after six months.—H. C. Bendixen (Copenhagen).

Russeff, C. (1938). Der heutige Stand der Tuberkulinfrage. [**The Present Status of the Tuberculin Problem**].—*Dtsch. tierärztl. Wschr.* **46.** 135-138. 1 table. [14 refs.]

R. re-emphasizes that the best tuberculin is prepared by growing tubercle bacilli upon Dorset's synthetic medium [*V. B.* **8.** 520]. In addition it is emphasized that a campaign to control bovine TB. will not be successful unless porcine and avian TB. are also eliminated at the same time.—E. J. Pullinger.

Boquet, A. (1937). Tuberculines et réactions tuberculiniques. [**TB. and Tuberculin Tests**].—*Rec. Méd. vét.* **113.** 696-715.

The preparation of " old tuberculin " and synthetic tuberculins is described. It is noted that the properties of tuberculin rest in the protein fraction, which in synthetic media can be estimated and was found in the case of strain H 37 (human) to reach a maximum at the 12th week and with strain Vallée (bovine) at the sixth week. B. considers that the local and general reactions of tuberculin are probably due to two separate entities. Pasteur Institute tuberculin is prepared in synthetic medium and sterilized by filtration after 6-8 weeks' growth. Precipitation is effected by a mixture of phosphotungstic and sulphuric acids, and separation is done by centrifugation. The precipitate is washed with dilute sulphuric acid and eluted with $Ba(OH)_2$ solution. It is then centrifuged, decanted and filtered and has a strength approximately equal to that of " old tuberculin ". Methods of titration, and allergic and desensitization phenomena, are discussed, together with a short notice of the theories of the mechanism of allergy.—P. S. Watts.

Štriter, V., & Kotljarova, H. (1937). Serologičeskaja i allergičeskaja diagnostika brucelleza u ovec v paralleljnyfh opytah. [**A Comparative Study of Allergic and Serological Methods of Determining Brucellosis in Sheep**].—*Brucellosis in Sheep.* pp. 295-302. 4 tables. Moscow : Viem Publ. Dept.

The authors give a general critical survey of the results obtained during the three years of the Sheep Brucellosis Commission's activity in North Caucasus. From the first the complement-fixation test was found to offer no advantages over the agglutination test, and was discarded from further study because of its complexity. All the data collected are considered to establish conclusively the superiority of the allergic to the aggl. test, especially by reason of the small percentage of

doubtful and false negative results obtained with the former in both naturally and experimentally infected animals. " Brucellysate " [*V. B.* **9.** 96.] is again stated to have given the most reliable results, its very low sensitizing action allowing as many as three tests, at intervals of one or two months in animals suspected to be infected. In important cases, however, such as the selection of breeding ewes for artificial insemination, it is considered advisable at the first test to use both the agglutination and allergic methods simultaneously.

I. Pohl, G. (1937). Beitrag zum Vorkommen unspezifischer Reaktionen bei der Rotzkomplementbindung. [**Non-Specific Reactions in Complement-Fixation Tests for Glanders**].—*Berl. tierärztl. Wschr.* Dec. 3rd. 747-748.

II. Hupbauer, A. (1938). Einige Bemerkungen zur Mitteilung von Dr. G. Pohl : Beitrag zum Vorkommen unspezifischer Reaktionen bei der Rotzkomplementbindung. [**Comments on Pohl's Article on Complement Fixation in Glanders**].—*Ibid.* Jan. 28th. 53-54.

I. An imported horse in apparently good health gave positive reactions to the conglutination and agglutination tests for glanders. It had already been tested for glanders [method not stated] before importation. About 11 days after the positive reaction it reacted negatively and continued to do so from then onwards. P. considers that the positive reactions were non-specific.

II. H. quotes details from a previous publication of his own [*V. B.* **8.** 590.] claiming that horses usually give a positive reaction to the conglutination test 10-20 days after the mallein test. He suggests this as the reason for the positive non-specific reaction reported in I.—D. Slavin.

Pullinger, E. J. (1938). **Induced Tissue Resistance to** *Brucella abortus* **Infection.**—*J. Path. Bact.* **47.** 413-422. 3 figs. on 2 plates, 5 tables. [4 refs.]

The resistance of g. pigs to artificially induced *Br.a.* infection was markedly increased by the simultaneous injection of *Bacterium monocytogenes.* This increased resistance is thought to be due to the presence of macrophages which appear in response to the stimulus exerted by *Bact. monocytogenes.*

Pirosky, I. (1938). Sur les propriétés immunisantes antitoxiques et anti-infectieuses de l'antigène glucido-lipidique de *Pasteurella aviseptica.* [**The Immunizing Properties of the Glucido-Lipoid Antigen of** *Past. aviseptica*].—*C. R. Soc. Biol. Paris.* **127.** 966-969. [5 refs.]

Thirty-six mice were injected intraperitoneally at six-day intervals with the glyco-lipoid endotoxin of *Past. aviseptica,* in doses rising progressively from 0·005 mg. to 0·25 mg. (2·5 times the M.L.D.). Of the 32 survivors, 14 were injected with even higher doses and one survived ten times the lethal dose. The other 18 immunized mice survived suspensions in mucin of live *Past. aviseptica* in doses which were lethal to control mice. P. concludes that the active method of immunization used is no more effective than the passive method described in a previous article [*V. B.* **8.** 712.], and that the injection of endotoxin conferred specific resistance to infection.—R. O. Muir.

Meyer, K., & Pic, A. (1937). Anticorps tuberculeux lipo-polysaccharidiques. [**Tuberculous Lipo-Polysaccharide Antibodies**].—*Ann. Inst. Pasteur.* **59.** 594-609. 9 tables. [16 refs.] [See also *V. B.* **8.** 649].

The authors prepared special rabbit immune sera by the injection of aqueous extracts of heat-killed tubercle bacilli and, by a special process, " dissociation liquids ", respectively lipoid and protein in character, derived from a kaolin-

antigen-antibody mixture, all these being used in a series of antigen absorption experiments which are tabulated. They conclude from their results that lipoid and polysaccharide antigens are not present in a pure state in tubercle bacilli, but attached to proteins, forming a glyco-lipo-protein antigen complex. This induces the formation of a bivalent serum antibody with lipoid and polysaccharide valencies, the former of these being complementophilous. The antibody has a very feeble affinity for the monovalent polysaccharide antigen.—C. V. Watkins.

DISEASES, GENERAL

Stordy, R. (1938). **Animal Husbandry in Peru.**—*Vet. J.* **94.** 233-252.

S. gives an account of the steps taken since 1921 in the improvement of the sheep stocks on the high plateaux (13,000 feet) of the Peruvian Andes. Rams imported for grading purposes withstood the high altitudes well after a preliminary sojourn at the lower levels. Improvement schemes for cattle, horses and poultry proved unsuccessful, since imported animals failed to become acclimatized to the peculiar conditions existing at the high elevations. A veterinary laboratory was established in 1928, and its chief work has been the manufacture of lamb dysentery serum and a campaign against blackleg. Descriptions of the following diseases peculiar to the region are given :-- " brisket disease " of cattle, " alpaca disease ", dysentery in young alpacas, and sarcoptic mange in llamas. " Brisket disease " occurs in imported cattle taken to mountainous areas, and is characterized by general febrile symptoms and cardiac distress. General oedema follows, and is particularly prominent in the dewlap. Death occurs from heart failure. " Alpaca disease " is not described.—N. J. Scorgie.

I & II. Kaura, R. L. (1937-38). **Common Contagious and Parasitic Diseases of Poultry in India and their Control (Parts I and II).**—*Agric. Live-Stk India.* **7.** 745-755, and **8.** 26-27. 21 figs. on 5 plates.

III. Tucker, F. C. (1938). **Controlling Poultry Diseases.**—*J. Amer. vet. med. Ass.* **92.** 653-662.

I. The general measures applicable in disease control are enumerated, and a brief account is given of a number of specific diseases, *viz*, tuberculosis, pullorum disease, fowl typhoid, fowl cholera, coccidiosis, fowl pox and Newcastle disease.

II. This contains an account of spirochaetosis, and also particulars of a number of parasitic worms and the diseases they cause.

III. This is mainly a consideration of pullorum disease and coccidiosis, with experiences of their control. Conventional methods are dealt with.—W. J. I.

de Aquino, D. (1937). Pullorose e eimeridioses no Brasil. Verificaçoes feitas no Estado de Santa Catharina e na Estação Experimental de Deodoro. [**Fowl Paratyphoid and Coccidiosis in Brazil**].—*Bol. Soc. brasil. Med. vet.* **7.** 9-23. [Numerous refs.]

A description of cases of pullorum disease and coccidiosis observed in Tubarão, State of Santa Catharina, with a review of the literature on Eimeriidae of animals found in Brazil up to 1935. No new material is given.—S. Torres.

I. Lloyd, D. J. (1937). **Diseases of the Living Animal in Relation to Defects in Leather.**—*Preparation of Empire Hides and Skins.* pp. 3-7. London : Imperial Institute. [8vo] [3s. 6d.]

II. Wilson, P. W. (1937). **Defects due to Mechanical Damage to the Living Animal.**—*Ibid.* pp. 7-9.

I. The diseases of the living animal which affect the leather are discussed under the headings of " parasitic ", " fungal ", " virus ", and " nutritional " conditions.

Those of parasitic origin are of greatest importance. Mange (sarcoptic and follicular), tick infestation, and warble fly disease cause vast economic loss throughout the world.

Only ringworm and streptothricosis are worthy of mention among the fungous diseases, and even they are not of great moment.

Of the virus diseases, rinderpest and the pox group cause most hide trouble.

Of the nutritional diseases, " cockle " and " rape blast " are mentioned as causes of abnormality in sheep skins : the former consists of nodules in the corium, and the latter causes defects in the grain of tanned skin. " Rape blast " occurs in New Zealand sheep, and is thought to be associated with the feeding of rape in large quantity.

II. Nearly all defects of this origin are avoidable. Barbed wire scratches especially cause serious damage. The provision of other kinds of fences and of rubbing posts and the destruction of ectoparasites are discussed and emphasized. Brand marks will not damage the hide if used on hoof, ear or cheek only. Currycomb scratches, thorn scratches, goad marks and horn wounds can be avoided easily, the latter by the dehorning operation.—D. D. Ogilvie.

Green, R. G., Bell, J. F., Evans, C. A., & Mather, D. W. (1937). **Report of Minnesota Wildlife Disease Investigation 1936-1937.** pp. 177. Numerous tables, 1 chart. [4to] [Mimeographed].

An account is given of investigations into diseases of numerous animals and birds. In addition to routine reports, comprehensive surveys are made of the following :- " shock disease " (due to being caught in traps), tularaemia, skein-like mottling of the liver, lungworms, tapeworm cysts, and fleas and ticks in hares and rabbits ; ulcerative enteritis, cannibalism, food poisoning, blackhead, and tuberculosis in quail ; lead poisoning in ducks ; tuberculosis in pheasants ; roundworm in Hungarian partridges ; botulism in various waterfowl, and intracellular distemper inclusions and " Chastek " paralysis in foxes [so called because it was first observed on the Chastek fox farm at Glencoe, Minnesota].—D. D. Ogilvie.

Shillinger, J. E., & Rush, W. (1937). **Post-Mortem Examinations of Wild Birds and Mammals.**—*Misc. Publ. U.S. Dep. Agric.* No. 270. pp. 15. 6 figs.

A number of disease conditions of wild animals and birds are described.

Necrotic stomatitis occurred most frequently in ruminants on preserves or concentration areas where supplementary feeding was given. Rapid destruction of the soft tissues of the mouth, and later the teeth and jawbone was usual, but occasionally infection of the internal organs occurred.

Pneumonia was generally associated with some irregularity in the life habits of the animal, or with lungworms. Enteritis was a common cause of loss. It might be of parasitic, infectious, or digestive origin. Tularaemia affected many mammals and birds and was highly infectious to man. Botulism and lead poisoning were of greatest importance in waterfowl. Parasitism was a frequent cause of death, while starvation was often of moment as a contributory factor.—D. D. Ogilvie.

Hupbauer, A. (1938). Enzooticka bronhopneumonia teladi. Influenca teladi ? [**Broncho-Pneumonia of Calves; Possibly a Type of Influenza**].—*Vet. Arhiv.* **8.** 349-361. 2 tables. [9 refs.] [German summary].

H. investigated broncho-pneumonia in calves [see *V. B.* **8.** 790]. Filtrates of affected lung material set up infection in healthy calves, and it is inferred that the cause of the condition is a filtrable virus which infects *via* the nasal tract. Bacteria demonstrated were considered to be secondary invaders, but responsible for certain of the lesions. It is suggested that the condition should be regarded as a bovine influenza, although the general affection apparently only attacks very young animals. The investigation was on a very small scale, eight healthy calves only being used. Calves are said to be susceptible during the first six weeks of life and perhaps longer.—B. Oswald (Križevci).

I. Mulhearn, C. R. (1936). **Three-Day Sickness of Cattle.**—*Qd agric. J.* **46.** 782-787. 3 figs.

II. Mulhearn, C. R. (1937). **Ephemeral or Three-Day Fever in Northern Queensland: Its Diagnosis and some Preliminary Investigations.**—*Aust. vet. J.* **13.** 186-191. [8 refs.]

III. Anon. (1937). **Ephemeral Fever or "Three Day Sickness" of Cattle.**—*J. Dep. agric. Vict.* **35.** 130-133. 2 figs.

I. M. describes the disease as it occurred in Queensland. Only bovine animals were affected.

II. M. describes the transmission of the disease by the inoculation of healthy cattle with the blood of affected animals. Transmission could not be effected by contact or by the inoculation of virulent blood which had been filtered through Seitz EK or K pads or Pasteur-Chamberland L2 candles. Horses, sheep, goats and small laboratory animals proved insusceptible when inoculated with material capable of producing the disease in cattle.

III. An account of the disease as described by authors in other countries is given, together with a brief description of its spread in Australia. In the latter country the morbidity rate in infected herds was as high as 80%, but the mortality rate was very low. The distribution of the disease suggested the presence of an insect vector.—T. S. Gregory.

Holz. (1938). Beiträge zur Pathologie des Zentralnervensystems. VIII. Uvula-fibrose. [**Pathology of the Central Nervous System. VIII. Fibrosis of the Cerebellar Uvula**].—*Berl. tierärztl. Wschr.* July 15th. 413-415. 5 figs. [See also *V. B.* **8.** 303].

An eight-year-old draught horse died with symptoms of colic, shown at autopsy to have been due to embolism from a parasitic aneurysm. The internal organs showed the changes commonly present in equine infectious anaemia, and the animal had been suspected of being a latent carrier of the virus for five years prior to death. The cerebellum showed multiple foci of fibrosis, especially around blood vessels in the region of the uvula. These changes are considered to have been the result of infection with the virus of infectious anaemia, and to represent the final stage of an original ependymitis granularis.—E. G. White.

Kingston, G. S. (1938). **Equine Goitre.**—*J. R. Army vet. Cps.* **9.** 178-180.

A number of cases of goitre in horses in Saugor, India, are described. Hypertrophy of the thyroid, rapid loss of condition on exertion, exhaustion, and harshness of the coat were the essential symptoms of the disease. Medicinal treatment was of no avail. A 14-year-old Australian gelding with unilateral enlargement of the

gland was subjected to thyroidectomy. Histological examination of the excised gland showed colloid goitre; blood analysis revealed a low iodine content. The condition did not improve.

K. suggests, as the probable cause of the condition, that the iodine was rendered inert in the bowel by combination with the calcium of the excessively hard water of the district. The absence of goitre amongst the human population indicates, however, that this is not the final solution of the problem.—D. D. Ogilvie.

Sedlmeier, H. (1938). Enzootischer Virusabort bei Stuten. [**Enzootic Virus Abortion in Mares**].—*Münch. tierärztl. Wschr.* **89.** 37-38. [3 refs.]

S. examined six equine aborted foetuses, all of which were 8-9 months old and appeared to be well developed. The placentas showed no pathological changes, and all the mares remained healthy after aborting. The only abnormalities discoverable in the foetuses were yellow discoloration of the conjunctiva, small necrotic foci and slight enlargement of the liver and spleen, hydrothorax, ascites, and petechiae in the lungs. Bacteriological examination of all organs was negative. From the clinical appearances the condition resembled that described by Dimock and Edwards in America [*V. B.* **7.** 318.] and S. suggests a virus as the causal agent. No experiments were made to substantiate this view [see also *V. B.* **8.** 716].—D. Slavin.

Haerid, O. (1937). Smitsom skjedekatarr som steriolitetsårsak hos storfe. [**Coital Exanthema as the Cause of Sterility in Cattle**].—*Norsk VetTidsskr.* **49.** 371-378.

A description of temporary infertility in cows and bulls which was evidently due to genital vesicular exanthema. Only clinical observations were made.

—H. C. Bendixen (Copenhagen).

Papp, G. (1937). Adatok a lovak ú. n. havivakságának kérdéséhez. [**Periodic Ophthalmia**].—*Állatorv. Lapok.* **60.** 319-321.

As a result of observations on the horses of the Hungarian mounted police, P. concludes that periodic ophthalmia only occurs in districts with a wet soil. He suggests that it is caused by certain [unspecified] plants which occur in the hay crops in those areas. The disease was set up in 21 horses by feeding them on such hay, and recovery followed a change of the hay supply. He concludes that periodic ophthalmia is an example of plant poisoning, and not an infection. [The evidence provided is inadequate].—G. Sályi (Budapest).

Kollonay, E. (1937). A lovak havivakságára vonatkozó gyakorlati megfigyelések. [**Periodic Ophthalmia in Horses**].—*Állatorv. Lapok.* **60.** 220-223.

Periodic ophthalmia occurs more frequently in marshy districts than in dry districts and attacks horses whether in good or bad health. K. observed more cases in light coloured horses than in dark coloured ones. He believes that there is some hereditary disposition and that it is not a case of intoxication by protein decomposition originating in the intestines.—Z. de Csukàs (Magyaróvár).

Guoth, G. E. (1937). A szembetegségek és -hibák elbírálása szavatosság nézőpontjából, különös tekintettel az ú.n. havivakságra. [**Eye Diseases of Animals in Forensic Medicine**].—*Állatorv. Lapok.* **60.** 89-92. [11 refs.]

Erdős, L. (1937). Megjegyzések Dr. Guoth és Dr. Kollonay közleményéhez a lovak szembetegségérol, illetöleg havivakságáról. [**Commentary on the Papers by Guoth and Kollonay**—*Állatorv. Lapok.* **60.** 89 **and** 220—**on Periodic Ophthalmia**].—*Ibid.* 272-273.

GÁBOR, G. (1937). Hozzászólás a havivakság kérdéséhez. [**Periodic Ophthalmia**]. —*Ibid.* 273-275.

These papers give opinions on periodic ophthalmia from the aspect of warranty. The cause is unknown and diagnosis is often difficult. Erdős suggests that horses should be sold with a warranty stating that they are free from periodic ophthalmia, and that it should be fixed for a period of 60 days.

—Z. DE CSUKÀS (MAGYARÓVÁR).

I. CLARK, H. C. (1937). **A Preliminary Report on Moon Blindness (Periodic Ophthalmia).** pp. 10. [13 refs.] Panama: Gorgas Memorial Library. [4to] [Mimeographed]. [Reprinted in *Vet. Rec.* **49.** 1322].

II. DINSMORE, W. (1937). **Special Report from the Horse and Mule Association of America, to Veterinarians who Reported in October, November and December, 1937, on Moon Blindness they had Observed in 1936 and 1937.** pp. 4. 1 table. [8vo] [Mimeographed].

III. SCHLOTTHAUER, C. F. (1938). **Recurrent Ophthalmia (Iridocyclitis).**—*Vet. Med.* **33.** 210-215. 6 figs. [Numerous refs.]

IV. STUBBS, E. L., & RATCLIFFE, H. (1938). **Studies of Recurrent Ophthalmia of Horses.**—*Vet. Ext. Quart. Univ. Pa.* **38.** No. 69. 3-12. 3 tables.

I. This is an account of a period of investigation into the cause, treatment and prevention of periodic ophthalmia in equines. The disease occurred in 109,739 horses and mules imported from the United States of America for use in the British army during the South African War. The cause of the disease has not yet been determined, though opinions have been expressed that the cause is either :– (a) bacterial infection ; (b) vitamin A-deficiency ; (c) a virus disease ; (d) a parasitological agent, or (e) an allergic condition.

The disease first attacks the iris, and in later stages the whole eye becomes involved. The incidence of the disease is higher in the horse than in the mule ; no curative treatment is known, but the mortality rate is insignificant.

C. believes that there is bacterial infection due to secondary invasion, that food deficiency may only be considered as a contributory factor, and that a virus agent may be implicated, as asserted by WOODS and CHESNEY [(1930). *J. exp. Med.* **52.** 637.] ; he does not support the view that the condition is due to parasitism or allergy.

II. In November, 1937, a questionnaire relative to periodic ophthalmia in equines was sent to veterinary surgeons in the U.S.A. In the 636 replies recorded, 8,993 cases were reported from various centres, indicating that the disease was widespread in the U.S.A., but most general in the east and middle west.

The result of the investigation shows that the disease was not prevalent on farms kept in a high state of fertility by dressing with lime and phosphates. It is suggested that on such farms the animals possess a sufficiently high resistance to throw off a possible infection.

III. This disease affects the iris, ciliary body and lens, the cornea and posterior structures of the eye being subsequently affected. The aetiology has not been definitely established.

The earliest symptoms noticed are conjunctivitis, followed by ptosis and miosis. In late stages of the disease the aqueous humor may contain blood or pus-like exudate. The iris becomes oedematous, and subretinal haemorrhages or inflammatory exudate may cause detachment of the retina. In treatment, ROSENOW and others [(1927-1928). *J. Amer. vet. med. Ass.* **71.** 378, and **72.** 419.] obtained good results with a vaccine. Good therapeutic effects were also obtained by giving foreign proteins in the form of intramuscular injections of sterile milk in conjunction with atropine, provided there were no permanent lesions affecting the eyes.

IV. Owing to an outbreak of ophthalmia in horses in south-east Pennsylvania in 1933 and 1934, a committee was formed to investigate the nature of the disease. As possible factors in the aetiology, soil, climate and food were considered.

In experiments carried out, rabbits, horses and calves were used. It was shown that the eyes of horses affected by periodic ophthalmia, contained a factor which might be passed through a Berkefeld N candle and which, when injected into the eyes of horses or of rabbits, would produce the acute stage of the disease; and injection of filtrate from the eyes of those experimentally affected also caused the disease in horses and rabbits.—BRENNAN DEVINE.

BLUM, H. F. (1938). **Domestic Animal Diseases Produced by Light.**—*J. Amer. vet. med. Ass.* **93.** 185-191. 1 fig. [Numerous refs.]

In an introductory discussion of the spectrum and the general effects of light upon living tissues, the more important diseases caused by photodynamic action are described. The effects have little or no connexion with sunburn. The wavelengths which produce the photodynamic effects vary with the sensitizing substance. A knowledge of the absorption spectrum of a photodynamic dye allows a forecast of the wavelength which will produce the photodynamic effects, and conversely, it is therefore possible to form an idea of the photodynamic substance. This is of value in establishing the aetiology of diseases produced by light.

B. enumerates three postulates to be fulfilled before a disease can be attributed to photodynamic action, *viz*:–(1) The disease must be reproduced by exposure to light, and the symptoms [unless very advanced] must disappear when the animal is protected. (2) A substance must be isolated, which will produce photosensitivity when injected. (3) The wavelengths which produce the photosensitivity after injection of the sensitizing substance must be the same as those which produce the disease.

St.-John's-wort poisoning, geeldikkop, buckwheat poisoning, and clover disease, are discussed in the light of these postulates, and a review is given of the general symptomatology of diseases caused by light.—D. D. OGILVIE.

ENGELHARDT, H. (1938). Ueber seuchenhaftes Auftreten von pockenartigen Ausschlägen einhergehend mit Dünndarm- und Leberveränderungen bei Schweinen. [**An Outbreak of Pox-Like Skin Disease Combined with Intestinal and Hepatic Changes in Swine**].—*Prag. tierärztl. Arch.* **18.** 99-104.

During the preceding four years E. encountered an increasing number of deaths among piglets occurring usually 8-14 days after purchase in the market. P.M. lesions included a greyish discoloration of the skin with pock-like scars and incrustations; the liver was usually of a firmer consistence than normal, and studded with yellowish lesions of varying size. The lesions were shown histologically to consist of degenerated liver cells surrounded by a fibrous capsule; in close relation to the latter were enormous numbers of organisms. A glomerulonephritis was usually present. Paratyphoid organisms could always be isolated from the liver.

The disease in piglets was always preceded by a similar condition in the sow, usually in the second week following parturition. The symptoms included a rise in body temperature and the appearance of pock-like lesions on the skin of the mammary glands which the owner often attributed to injury by the piglets. The lesions sometimes extended over the whole body, there was then a marked rise in temperature, and loss of appetite. At this time the sucking piglets develop lesions, first around the eyes and snout, and spreading later over the whole body. In

untreated cases the mortality in most litters was 80-100%. Sows and fattening pigs appeared always to recover within 1-2 weeks.

An autopsy on very young pigs usually revealed, in addition to the above lesions, fibrinous peritonitis and a diphtheritic deposit in the ileum. Paratyphoid organisms were especially numerous in the skin lesions.

Treatment of the piglets with 5-10 c.c. of the sow's blood injected subcutaneously together with a suitable polyvalent paratyphoid serum is stated to be successful. Vaccination of healthy piglets is suggested where there is danger of infection from neighbouring animals, and a more strict inspection at markets is recommended.—E. G. White.

Baschung, Langeron, M., & Leblois. (1937). Hyperkératose amiantacée équine localisée (fausse teigne amiantacée). [**Localized "Asbestos-Like" Hyperkeratosis Simulating Ringworm in a Horse**].—*Ann. Parasit. hum. comp.* **15.** 544-551. 12 figs. on 2 plates.

A description of an apparently rather rare skin condition in a horse. The lesions consisted of two glabrous areas symmetrically placed below the eyes, and groups of plaques distributed over the neck, body and legs, on which the hair was short and covered by a greyish-white sticky exudate. The authors examined material for fungous parasites but could demonstrate none. They describe the characters of a diplococcus which was isolated from the lesions, but considered it was of no significance. The cause of the lesions was not determined.—N. J. S.

NUTRITION IN RELATION TO DISEASE

Meisters, N. (1938). Untersuchungen über die puerperalen Stoffwechselkrankheiten. Die Azetonämie und einige andere Kuhkrankheiten. Prophylaxe der puerperalen Stoffwechselkrankheiten der Kuh. [**Puerperal Metabolic Diseases, Acetonaemia, and other Diseases of Cows, and their Prevention**]. —*Dtsch. tierärztl. Wschr.* **46.** 321-328. 3 tables. [16 refs.]

Observations were made on 17 cows with acetonaemia. The disease usually occurred in cows shortly after calving, in the early part of the year before the animals were turned out to grass. Symptoms set in gradually and took some weeks to become fully developed. Analyses of blood and urine showed that the pH of the blood was slightly below normal, with values lying between 7·70 and 7·55. The blood sugar was also reduced, varying between 59 and 54 mg. per 100 c.c. of blood, whilst the total blood acetone was greatly increased, varying between 34·8 and 15·3 mg. per 100 c.c. of blood with an average of 18·8 mg. The β-hydroxybutyric acid content of the blood was also increased, the average being 71·7 mg. per 100 c.c. On the other hand, the inorganic constituents of the serum were normal, thus differentiating acetonaemia from milk fever or puerperal eclampsia. The urine analyses showed high β-hydroxybutyric acid and acetone contents.

M. considers that acetonaemia is primarily the result of badly balanced rations, particularly feeding an over-abundant supply of concentrates, and also of lack of exercise. Good results were obtained by giving a diet of crushed oats and roughages. A mineral supplement was fed, and sodium bicarbonate was added to the drinking water. Daily exercise also proved highly beneficial.—J. A. Nicholson.

Ernst, W. (1938). Rhachitis und Osteoporose. [**Rickets and Osteoporosis**].—*Münch. tierärztl. Wschr.* **89.** 277-281 and 290-294. [8 refs.]

A general discussion, containing no new material.—J. A. Nicholson.

Wellman, O., & Urbányi, L. (1937). Adatok az ásványi anyagforgalom zavarainak chemiai diagnosztizálásához. [**The Chemical Diagnosis of Disturbances of Mineral Metabolism**].—*Közl. Oesszehas. élét- es kórtan Köréből.* **28.** 247-268. 8 tables. [7 refs.]

Urbányi, L. (1937). A csontok sóinak chemiai szerkezete. [**The Chemical Composition of Bones**].—*Állatorv. Lapok.* **60.** 204-207. 2 tables, 2 charts.

These papers cover the same ground as others published elsewhere [*V. B.* **8.** 112].—Z. de Csukàs (Magyaróvár).

Foot, A. S., & Thomson, A. Y. (1938). **The Prevention of Anaemia in Pigs Reared Indoors.**—*J. Minist. Agric.* **45.** 452-459. 1 fig., 4 tables. [3 refs.]

In controlled experiments on the prevention and cure of anaemia amongst young pigs it was found that administration of Fe to pregnant sows in the fortnight preceding parturition had no effect on the degree of anaemia induced in the piglets at two weeks old. The addition of Cu salts as well as Fe also had no apparent effect. Administration of Fe to the anaemic piglets will either cure or prevent the anaemia, but litters dosed with Fe during the second week were substantially heavier at weaning than those dosed during the third week. In the choice of Fe preparations, the pyrophosphate appears to have definite advantages over most other salts in that it is tasteless and has no marked astringent action.—Alfred Eden.

I. Murphy, R. R., Hunter, J. E., & Knandel, H. C. (1938). **The Effects of Rations Containing Gradient Amounts of Cod Liver Oil on the Subsequent Performance of Laying Pullets Following a Natural Infection of Coccidiosis.**—*Poult. Sci.* **17.** 377-380. 3 figs. [6 refs.]

II. Becker, E. R., & Wilcke, H. L. (1938). **The Influence of Dried Buttermilk in Rations on Fatality with Coccidiosis in Chicks.**—*Ibid.* 405-407. 2 tables. [3 refs.]

I. Measured amounts of cod liver oil ranging from 0·0625 % to 1 %, fed from time of hatch to 72 weeks of age, were added to otherwise adequate rations given to eight groups each of 50 White Leghorn pullets. Following an outbreak of caecal coccidiosis the body weight of all groups decreased, but the pullets on the higher levels of oil regained the weight more rapidly than those on the lower levels. The egg production and the mortality immediately following the infection also showed a definite relationship to the amount of oil fed ; in the low-oil groups egg production decreased and mortality was higher. The pullets of all groups moulted but the groups fed with the high-oil diet did not go through as severe or as complete a moult as those on the low-oil diets.

II. Four groups each of 56 chicks were used for testing the influence of dried buttermilk on mortality in experimental caecal coccidiosis. Two rations of the ordinary type with 10 % and 40 % dried buttermilk respectively gave a higher mortality than one with no dried milk, although the latter did not provide such good growth. When the remainder of the ration consisted only of corn, oats and bran, the addition of 40 % dried buttermilk did not result in a significantly higher number of fatalities, and, therefore, the authors consider that the increased mortality cannot be attributed solely to the buttermilk.—R. Allcroft.

Tully, W. C. (1938). **A Nutritive Disease of Chicks Caused by Feeding Dried Eggs.**—*Poult. Sci.* **17.** 355-368. 3 tables, 5 charts. [Numerous refs.]

Experiments are reported with 22 lots of chickens fed commercial dried egg and egg-white in which these products were used both as the only source of animal protein and with various supplements.

Poor growth and the pellagra syndrome in a severe form resulted from the feeding of either raw egg-white or dried egg-white in rations otherwise complete; even when supplements of yeast, milk, or combinations of these were given, growth was not good and the pellagra syndrome was still severe. When whole dried egg was fed at the same protein level, growth was much better and the pellagra syndrome almost absent.

Haemoglobin figures for chickens from seven lots showed that the range of the averages was from 4·9 to 8·9 g. per 100 c.c. The serum albumin and globulin contents of the chick blood was determined, and the results indicated that both the ration and the age of the birds has a marked effect on these two blood proteins —R. Allcroft.

Morgulis, S., & Osheroff, W. (1938). **Mineral Composition of the Muscles of Rabbits on a Diet Producing Muscle Dystrophy.**—*J. biol. Chem.* **124.** 767-773. 1 table. [13 refs.]

A marked increase in the Cl and Na and an enormous increase in the Ca content was observed in the muscles of dystrophic rabbits. The K content was greatly diminished and the changes in Na and K almost compensated each other. When the diet producing dystrophy was supplemented with wheat germ, the Ca and K levels soon returned to normal, as also did the Cl and Na content in two out of three dystrophic animals.—R. Allcroft.

Jukes, T. H., & Babcock, S. J., Jr. (1938). **Experiments with a Factor Promoting Growth and Preventing Paralysis in Chicks on a Simplified Diet.**—*J. biol. Chem.* **125.** 169-181. 1 fig., 6 tables. [Numerous refs.]

Results of investigations on a nutritional paralysis produced in chicks by feeding a simplified diet show that there are two different forms of the same active factor or factors, since protection against paralysis was given by a fat-soluble fraction prepared from soya bean oil and by a water-soluble fraction prepared from fat-extracted alfalfa meal. The addition of alfalfa meal to the diet improved growth and prevented paralysis to a greater extent than did soya bean oil. Other fractions of the water-soluble extract of hexane-extracted alfalfa meal were investigated, but were not found to contain the protective factor.—R. Allcroft.

I. Insko, W. M., Jr., Lyons, M., & Martin, J. H. (1938). **The Effect of Manganese, Zinc, Aluminium and Iron Salts on the Incidence of Perosis in Chicks.**—*Poult Sci.* **17.** 264-269. 2 tables. [11 refs.]

II. LeMasurier, H. E., & Branion, H. D. (1938). **A Radiological Study of the Development of the Fowl to Six Weeks of Age on a Mineral Deficient Ration.**—*Ibid.* 270-275. 1 fig., 7 plates, 1 table. [3 refs.]

I. The protective action of manganese against slipped tendon when added to the basal ration in the form of manganese sulphate at a level of 30 p.p.m. is evident from the data. These results confirm the work of Wilgus, Norris and Heuser [*V. B.* **8.** 244 and 722.], but do not agree with their report on the protective action of aluminium and zinc. The addition of 30 p.p.m. of Al, Zn and Fe to a ration containing 0·61% Ca, 0·49% P and 4·5 p.p.m. Mn gave no protection, but rather increased the incidence of slipped tendon.

II. Two groups each of 50 Barred Plymouth Rock day-old chicks were fed the Ontario Agricultural College Baby Chick Cafeteria ration for a period of six weeks, the control group receiving a mineral supplement of bone-meal, oyster shell and fine grit. X-ray examinations showed that two distinct types might be found in a flock on a mineral deficient ration :–

" (1) a small bird that has utilized the available mineral to develop a comparatively normal skeleton, but having a skeleton only comparable in development to that of a bird of the same weight fed on a normal ration, and (2) a moderately large bird that has grown at the expense of its skeletal structure, which shows typical rachitic lesions."

The series of X-ray plates indicate that the degree of severity of rickets is directly proportional to the amount of growth which the bird has achieved.—R. A.

CAPODAGLIO, A. (1938). Intorno alla genesi alimentare della distrofia tossica del fegato dei suini. [**Nutritional Hepatic Dystrophia in Swine**].—*Clin. vet., Milano.* **61.** 94-97. [6 refs.]

C. describes briefly toxic liver dystrophy in fattening pigs, and suggests that it may be due to the excessive use of maize, which is deficient in vitamin B, in the amino acid, lysine, and in tryptophane, the latter being essential for digestion of proteins.

MCCULLOUGH, N. B. (1938). **Vitamin C and Resistance of the Guinea Pig to Infection with Bacterium necrophorum.**—*J. infect. Dis.* **63.** 34-53. 9 figs. [Numerous refs.]

M. studied the relation of vitamin C-deficiency in the g. pig to infection with various strains of *Fusiformis necrophorus.* In extremely scorbutic g. pigs, avirulent human strains which failed to produce lesions in normal g. pigs produced minor abscesses. These strains had no effect on g. pigs with subacute scurvy. Administration of vitamin C had a curative effect on infected scorbutic g. pigs.

With more virulent animal strains, a more severe degree of infection occurred in scorbutic g. pigs. Severe scurvy was necessary before a decrease in resistance to this organism could be demonstrated.—D. L. HUGHES.

MIRIMANOFF, A. (1938). Vitamine C et chlorophylle. [**Vitamin C and Chlorophyll**].—*C. R. Acad. Sci., Paris.* **206.** 766-768.

An analysis of different parts (leaves, stems, flowers, and bulbs) of vegetables and flowers showed that there is no correlation between the vitamin C content and the presence of chlorophyll.—R. ALLCROFT.

PUBLIC HEALTH

RABAGLIATI, D. S. (1937). **Present-Day Administration of the Milk and Dairies Legislation as Influenced by the Work and Teachings of Sir John M'Fadyean.**—*J. comp. Path.* **50.** 351-355. [7 refs.]

M'FADYEAN was the first to bring to the notice of British veterinarians the diagnostic value of Koch's tuberculin, and he predicted its use for the eradication of bovine tuberculosis.

In collaboration with SIMS WOODHEAD, in 1891, he issued a warning concerning the use for children of milk from cows with tuberculous udders, and stressed the great necessity for the routine inspection of dairy cattle and other food animals.

He pointed out the importance of bovine TB. from the agricultural aspects, and challenged Koch's assertion that bovine TB. was not communicable to man.

R. refers to M'FADYEAN'S published work on TB.—H. E. BYWATER.

I. RICE, J. L. (1936). **The Future Milk Supply—A Challenge.**—*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 175-184.

II. Godfrey, E. S., Jr. (1936). **The State's Place in the Program of Milk Sanitation.**—*Ibid.* pp. 185-188.

I. R. gives a summary of the improvements in the standard of New York milk since 1901; 99% of the milk is now pasteurized, the infant death rate has fallen from 12·6% to 4·7%, and the typhoid death rate from 20·5 per 100,000 to 0·5 per 100,000. On the other hand, he considers that the average bacterial count is still far too high, and that the flavour and purity of the milk should be further improved, as the milk consumption in New York City is below the desired maximum.

II. On his appointment as Commissioner of Health for New York State, G. outlined his policy in this general article on milk control. In his view the only safe milk is pasteurized milk, and he aims at increasing the efficiency of pasteurization. The State is now responsible for the approval of pasteurizing plants, and this work is carried on by engineers as well as by milk inspectors. The article is written mostly from the administrative view point.

I. Pincus, S., Abraham, S., & Tiedeman, W. D. (1936). **Comparison of Certain Tests Applicable to Raw Milk as Received at Plants.**—*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 35-55. 6 tables.

II. Ramsdell, G. A. (1936). **The Resazurin Test for the Sanitary Condition of Milk.**—*Ibid.* pp. 57-72. 2 figs., 3 tables. [6 refs.]

III. Gilcreas, F. W., & Davis, W. S. (1936). **Investigation of the Amylase and Phosphatase Tests as an Indication of Pasteurization.**—*Ibid.* pp. 73-94. 1 fig. on 1 plate, 12 tables, 1 graph. [5 refs.] [Also appeared in *Proc. int. Ass. Milk Sanit. 1936.* pp. 15-32].

I. The authors describe experiments carried out to decide on a quick and reliable test for raw milk as it arrives at the receiving plant, preferably a simple test that could be done without a great deal of apparatus or technical supervision. The odour test, strainer dipper test, sediment test, temperature test, direct microscopic bacterial count, plate bacterial count, methylene blue reduction test, bromcresol purple test and curd test were compared. Results showed that the microscopic count was the most reliable test, but that it did not detect dirty milk. In practice it has the disadvantage of requiring considerable equipment, and a skilled man to carry it out. The methylene blue reduction rate was shown to have no close relation to the bacterial count. The most effective convenient test was found to be the odour test; this detected about 70% of the high-count milk, and rejected no more healthy milk than the methylene blue test. There seems to be no difficulty in training ordinary Department of Health field men to carry out this test; used in conjunction with the strainer dipper test for dirt detection, it should be of great value in milk control work.

II. An account of experiments to determine the comparative value of the resazurin and methylene blue tests for the sanitary condition of milk. The resazurin test is speedier, as it will give results in one hour, whereas the methylene blue test, on the other hand, requires five hours. For this reason the resazurin test gives a more accurate estimation of the original bacterial contamination, as it is not influenced by the multiplication that must take place during prolonged incubation. Pathologically or physiologically abnormal milk can be detected with greater accuracy by the resazurin test; this test has also proved to be more effective in demonstrating the presence of slowly-reducing organisms, as it reduces at a higher oxygen level. Full tables are given, showing classifications of milk of known quality by the two tests.

III. The authors undertook a series of experiments to demonstrate the value of the amylase and phosphatase tests for the efficiency of pasteurization, the

undestroyed amylase being detected by iodine solution, and the phosphatase by the phenol liberated from added disodium phenyl phosphate. They found that although in general the amylase test distinguished heated from unheated milk, it was not always reliable, and could not accurately detect differences in the degree of pasteurization. The phosphatase test was far more satisfactory; it could differentiate between treated and untreated milk, estimate correctly the degree of treatment of 97% of the samples to which it was applied, and detect as little as 0·1% of added raw milk. The article contains full tabulated results of the experiments, and should be consulted for details of procedure.

BREED, R. S. (1936). **Desirable Changes in Standard Media and Incubation Temperatures.**—*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 107-121. 2 figs.

The author states that the chief need of milk hygiene in Europe is to eliminate the dangerous pathogenic organisms from the milk, while in the U.S.A., owing to the low incidence of TB., the aim is rather to keep the general bacterial count low. B. points out that for this purpose the standard meat extract agar used in the U.S.A. is not the most suitable medium. He suggests that this medium should be replaced by a tryptone-glucose skim-milk agar, and that the temperature should be changed from 37°C. to 32°C. The article includes charts of experiments he carried out on this work; according to these charts a noticeably higher average count is obtained with the skim-milk agar at 32°C. than under any other conditions.

NEVEU, R. (1937). Le rôle du lait et de ses dérivés dans l'étiologie de certaines épidémies de fièvre typhoïde. [**Milk and Milk Products and Enteric Fever**]. —*Rev. Microbiol., Paris.* **3.** 194-197. [15 refs.] [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 859. Signed W. G. SAVAGE].

The author points out that while water and shellfish are well recognized as vehicles for the transmission of typhoid fever, there is a danger that milk is inadequately appreciated as a means of spread. He instances a number of milk-spread outbreaks in France and other countries. One outbreak in which he assisted was extensive and was traced to the milk vessels being washed in a tank, the same tank being used to rinse the clothes of the milk dealer's wife who had suffered from an attack of typhoid fever. He discusses the danger of unrecognized typhoid and paratyphoid bacillus carriers and mentions another outbreak in which he was concerned due to an unrecognized paratyphoid carrier. He considers that both pasteurization and rigorous control over the milk supply are required. [No outbreaks due to milk products are mentioned although indicated in the title.]

HENNINGSEN, E. J., & ERNST, J. (1938). **Milk Epidemic of Angina, Originating from a Cow with Mastitis and due to** *Streptococcus pyogenes* **(Lancefield Group A).**—*J. Hyg., Camb.* **38.** 384-391. 1 fig. [9 refs.] [See also *V. B.* **8.** 681].

The authors describe an explosive epidemic of sore throat in a community of 750, involving 100 cases nearly half of which occurred within three days. The outbreak was moderately severe, but there were no deaths. All save one patient had consumed unpasteurized milk from a common source.

A streptococcus was isolated from 74 of the patients examined and also from three persons handling milk. A cow with a slight degree of mastitis was found to be excreting *Str. pyogenes* (Lancefield Group A), and this organism was isolated from 17 of the patients. It was assumed that infection passed from milkers to the cow, and thence to the milk supply.—H. E. BYWATER.

HUCKER, G. J., & MARQUARDT, J. G. (1936). **The Survival of Streptococcus Pyogenes in Cheddar Cheese.** —*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 171-174. 2 tables.

The authors describe experiments which demonstrate that *Str. pyogenes* can survive for some months in cheese cured at 40°F., but not if the curing temperature is raised to 60°F. During the course of the investigations an epidemic of milk-borne sore throat occurred, and the authors found that cheeses made from the contaminated milk contained viable *Str. pyogenes*.

LEHMKUHL, H. W. (1936). **Use of Chlorine Solutions on the Dairy Farm.**—*Rep. N. Y. St. Ass. Dairy & Milk Inspectors, 1936.* pp. 131-152. 2 tables.

L. deals with some of the problems associated with chlorine disinfection on the dairy farm, and the article is written mainly for dairymen and inspectors. He points out that in many cases the solutions are left so long without renewal that they become a fresh source of bacterial contamination for the milking utensils. Soap should never be used for cleaning utensils before they are chlorinated, as it will interfere with action of the chlorine. Under certain conditions solutions may lose strength ; to control this L. suggests the use of the starch-iodide test to determine the chlorine concentration.

VON OSTERTAG, R. (1936). Die Ausführungsbestimmungen A zum Reichs-Fleischbeschau-Gesetz in der Fassung der bisher ergangenen Bekanntmachungen des Reichskanzlers und Verordnungen des Reichsministers des Innern. [**Administrative Instructions A for the Reich Meat Inspection Law, Germany**]. pp. 233. 4 figs., 3 tables. Berlin : Richard Schoetz. [7th Edit.] [8vo].

The author gives the whole of the German meat inspection act with explanations, and thus the book forms a guide for meat inspectors, not only in Germany, but also in other countries. There is a very extensive and lucid description of meat poisoning and the procedure of its detection and prevention, and an account of NIEBERLE's doctrine on the pathogenesis of tuberculosis.

A chapter deals with air raid precautions in abattoirs after gas attack. Lungs and tracheas of affected animals should be seized ; meat of such animals should only be used when cooked, and in the case of dressed carcasses so exposed 1 cm. of the outermost muscle-layer should be removed. The carcasses should be covered with grease-proof paper or cellophane to protect them against gas. The author gives as appendixes several official forms as used in the statistical surveys of records in Germany, also instructions for the freezing of beef infested with *Cysticercus bovis*, for taking and despatch of meat samples for bacteriological inspection, and also for the preparation of culture media for this purpose. A table is given indicating the various forms of TB. and the manner in which diseased meat should be dealt with.—M. F. BENJAMIN.

HAINES, R. B. (1938). **Observations on the Bacterial Flora of the Hen's Egg, with a Description of new Species of *Proteus* and *Pseudomonas* Causing Rots in Eggs.**—*J. Hyg., Camb.* **38.** 338-355. 9 tables. [16 refs.]

A study was made of rots in eggs. 98% of the whites of fresh eggs and 93% of the yolks examined were sterile. Rots were grouped according to colour. Black rot was due mostly to *Proteus* and, to a lesser extent, to species of *Pseudomonas*. Red and green rots were caused by particular strains of *Pseudomonas*. Fishy odour was due to species of atypical coliform bacilli, whilst " cabbage water " smell was due to *Pseudomonas* species.

Coliform and *Proteus* organisms isolated are described. The strains of *Proteus* investigated differed from *Pr. malanovogenes*, which causes black rot in South African eggs.—H. E. Bywater.

THERAPEUTICS

Holmes, F. (1937). **Mass Treatment of Oriental Sores.**—*J. R. Army med. Cps.* **69.** 258-260.

Apart from human cases, mention is made of the treatment of 12 dogs affected with cutaneous leishmaniasis of the face, by the local application of 20% $CuSO_4$ in 5% carbolic acid on four successive days, with repetition after 7-10 days if necessary. The ulcers healed in one month. The work was done in Baluchistan. —J. E.

Wille, J., Ocampo, J. A., Wéberbauer, A., & Schofield, D. (1937). El cube (*Lonchocarpus micou*) y otros barbascos en el Peru. [**Cubé and other Barbasco Plants in Peru**].—*Bol. Estac. exp. agric. Minist. Fom. Peru.* No. 11. pp. 117. 23 plates. [Numerous refs.] [Copied *verbatim* from *Rev. appl. Ent.* **25.** 284-285].

Part of this paper deals with the use of cubé (*Lonchocarpus nicou*) in dips against *Melophagus ovinus*, L., and *Sarcoptes* sp. on sheep, *Haematopinus eurysternus*, Nitzsch, on cattle, *H. suis*, L., on pigs, and a species of *Psoroptes* on alpaca in Peru. In 1935 more than 300,000 sheep were treated with cubé dip in the Junín region, and 150,000 in that of Puno. The dips were obtained either from an extract prepared by soaking the chopped roots in water for 48 hours, or from a powder finely ground so that 85 per cent. passed a sieve of 0·074 mm. mesh. Their practical application was studied in 1936 by J. F. Mitchell, who stated that the powder yielded a dip that was more saponaceous, and therefore penetrated better, than that from the extract. Dips made with the powder did not keep for more than 48 hours, a disadvantage owing to the numbers of animals to be treated, whereas those made with the extract kept for up to a week. The addition of ½ lb. soap per 100 U.S. gals was recommended, and also that of ½ lb. sodium carbonate to counteract the hardness of the water. For complete control of the parasites, cattle usually required two dips, with about a fortnight's interval, twice a year, and sheep the same, except when seriously infested, in which case a third pair of dips was necessary.

The effective concentrations of ground root containing 6·8 per cent. rotenone, and of extract containing 5·5 per cent. rotenone were, respectively, 1 : 2,000 and 1 : 10,000 for *M. ovinus*, 1 : 3,000 and 1 : 15,000 for *H. eurysternus*, 1 : 2,000 and 1 : 8,000 for *H. suis*, and 1 : 1,000 and 1 : 5,000 for *Sarcoptes* sp. and *Psoroptes* sp. The ground root and the extract were equally effective, and were in no way inferior to other dips.

In preliminary tests, cubé root containing 5 per cent. rotenone had no effect on the larvae of *Anopheles pseudopunctipennis*, Theo., after 15 hours, when used at a concentration at which it killed fish in 30 minutes.

Harwood, P. D., & Jerstad, A. C. (1938). **An Improved Critical Test for Poultry Taeniacides.**—*Poult. Sci.* **17.** 295-297. 1 table. [1 ref.]

Tests for poultry taeniacides are liable to unavoidable inaccuracy so long as birds with an unknown number of worms are treated.

In this article the following standard test of a remedy is described : birds are

artificially infested with a single tapeworm, and the result determined by P.M. examination. An experimental determination, using this method, is described in detail.—D. D. Ogilvie.

Kawai, T. (1937). **Experimental Studies on the Clonorchicidal Effect of Gentian-Violet. A Supplement: Value of Wakeshima's Egg-Counting Method as a Judgement of Anthelmintic Effect of Drugs against** *Clonorchis sinensis*. —*J. med. Ass. Formosa.* **36.** 923-933. [In Japanese: abst. from English summary p. 934].

K. studied the effect of gentian-violet given orally to dogs, using the egg-counting method. In light infestations (worm estimate 49) 18 mg. per kg. body weight administered every three days (total dose 1·2 g.) reduced the number of worms by 61%; in a moderate infestation (worm estimate 333) 18-20 mg. per kg. body weight daily for 19 days (total 3·04 g.) reduced the infestation by 42%, and in heavy infestations (worm estimate 1,215) 120 mg. daily reduced the number of worms by 25% in 30 days (total dose 3·6 g.) and by 36% in 45 days (total dose 5·4 g.). He concludes that gentian-violet given orally is effective against *Clonorchis*, particularly in light infestations, and that its anthelmintic property is in direct proportion to the dose given.

Bild, C. E. (1938). **The Treatment of Heart-Worm Infestation.**—*J. Amer. vet. med. Ass.* **93.** 179-184.

Before treatment is commenced, a comprehensive clinical examination of the patient is made. Dogs with persistent albuminuria, polyuria, heart-worm toxaemia, debility or senility, or whose urine has a low sp. g., make poor subjects. The patient is rested for about a week and given tonics. Filsol and fouadin seem nearly equal in immediate value, but filsol has the merit of giving a sterilizing cure, whereas with fouadin, relapse may occur after some months.

In average cases filsol is given intravenously every day for about two weeks. Initial doses average 1 c.c. per 25 lb. body weight, but later 1 c.c. per 12 lb. body weight may be given, with 5 c.c. as a maximum dose. Reactions due to antimony poisoning can occur, but unless exceptionally severe they can be controlled, and the mortality from the treatment kept below 2-3%.—D. D. Ogilvie.

I. Becker, R. B., & Gaddum, L. W. (1937). **The Composition of Limonites Effective and Ineffective in Correcting "Bush-Sickness" in Cattle.**—*J. Dairy Sci.* **20.** 737-739. 1 table. [4 refs.]

II. Neal, W. M., & Ahmann, C. F. (1937). **The Essentiality of Cobalt in Bovine Nutrition.**—*Ibid.* 741-753. 3 figs. [Numerous refs.]

I. Spectrographic analysis was made of two samples of New Zealand limonite, one effective and the other ineffective in curing "bush-sickness". Of the "trace elements" found, the effective one contained 50 p.p.m. Co, but there was no Co in the ineffective sample, although this contained 100 times as much Ba as the effective one; the Cu contents of the two samples were similar. The figures found are in fair agreement with those obtained by chemical methods.

II. Jersey calves were fed from birth on a ration obtained from "salt sick" areas. The ash of the fodder showed spectrographically complete absence of Co. Gradually a malnutrition was produced, reflected in inappetence and accompanying effects on growth, and there was evidence of a microcytic, hypochromic anaemia, although this was not very marked. The condition was aggravated by the use of an iron-copper supplement, but was prevented or cured by the daily oral administration of 5-10 mg. Co. Besides the general symptoms of malnutrition and lympho-

cytosis, P.M. examination showed pigment deposition (haemosiderosis) in the liver and spleen, and fibrosis and fatty changes in the liver, whilst the heart showed signs of myocardial degeneration and fibrous infiltration. Owing to the difficulties of measuring chemically the normal Co content of rations, biological response is given as the sole diagnostic method at present.—ALFRED EDEN.

POISONS AND POISONING

MARCOVITCH, S., SHUEY, G. A., & STANLEY, W. W. (1937). **Cryolite Spray Residues and Human Health.**—*Bull. Tenn. agric. Exp. Sta.* No. 162. pp. 46. 6 figs., 12 tables. [Numerous refs.]

This is an account of a study on the toxicity of fluorine in drinking water, as compared with that of cryolite in spray residues used to disinfest growing plants, experiments being carried out on white rats. It was ascertained that the smallest amount of fluorine, as cryolite, which would cause mottling in teeth, was 7 mg. per kg., while arsenic trioxide will interfere with growth in amounts as small as 0·0015 mg. per kg.

The results of the experiments indicated that fluorine-sprayed fruits or vegetables cannot be injurious to human health. [Though no tests were carried out on farm animals with sprayed greenstuff, the bulletin contains a great deal of information on fluorine tolerance and toxicity in general].—BRENNAN DEVINE.

DILDINE, S. C. (1938). **The Symptoms, First Aid, Treatment and Prevention of Gas Casualties in Horses and Mules.**—*Vet. Bull. U.S. Army.* **32.** 167-191. 1 table. [8 refs.]

D. gives statistics of animal losses in the Great War due to poison gases. He remarks that the figures are probably unreliable, as many cases of broncho-pneumonia, etc., were not recognized as being due to gas; he also speaks of skin lesions being sometimes wrongly diagnosed as mange. [This suggestion might be contested, at least in connexion with some armies]. He goes on to deal in detail with the chief poison gases, giving their characteristic odour, the symptoms they produce, and the treatment required. It is generally considered that horses and mules are little affected by the lacrimators, but D. points out that few observations have been made on the mule. Slight conjunctivitis may be caused by high concentrations. Some of the irritant arsenical smokes seem to cause irritation of the nasal mucosa in horses, but the action of others is unknown; D. urges that experiments should be carried out to determine the toxicity for horses and mules of forage and water contaminated by these smokes. Little is known of the treatment of equines for HCN gas poisoning, but D. suggests that the treatment for man (amyl nitrite by inhalation and heart stimulants) might be modified for animals. Horses can be killed by an atmosphere containing 0·05% CO_2; treatment is by artificial respiration and oxygen administration.

Horses show much the same susceptibility to the lung irritants as do human beings. Injured animals must be rested and kept warm, and oxygen treatment should be given in proportion to the gravity of the condition. Heart stimulants should also be given. The first 48 hours decide the outcome, and survivors recover in 1-4 weeks. The effects of chloropicrin have not been observed in large animals.

The skin, eyes, digestive tract and respiratory tract of horses are attacked by mustard gas. Immediate decontamination where possible is the first essential, and can be carried out with Dakin's solution or 20-30% chloride of lime. Eyes should be washed with a 3% boric acid solution. The naso-pharynx, oesophagus,

and stomach should be irrigated with a 3-4% solution of sodium bicarbonate; an emollient should be given to soothe the inflamed gastric and intestinal membrane, and the animal should be given cold water and soft foods. For greatly swollen mucous membranes a weak solution of adrenalin may be used. For throat and lung injuries, turpentine or tincture of benzoin inhalations should be given, and oxygen and heart stimulants administered where necessary.

Skin lesions caused by lewisite are more serious, and there is great danger of arsenic poisoning. Lesions should be soaked in 5% NaOH, and then washed with soap and water.

As a preventive, D. recommends gas masks, a treated boot and foot pad, and coverings for other parts of the body; he also suggests that gas-proof stables might be possible for collective protection. He points out that in a future war it may be necessary to safeguard meat-producing domestic animals from gas attacks. A full classification table of the gases is included.

ANDREONI, R. (1938). Gli animali in guerra aerochimica. [**Animals in Chemical Warfare**].—*Profilassi.* **11.** 97-102.

In any future war, the maintenance of food supplies will be of the utmost importance, and veterinarians must be competent to arrange for the protection of animals against air attack, to treat animals suffering from the effects of gas, and to know how to decontaminate fodder and other material.

Mustard gas is the one most likely to be used. If the concentration of gas has been weak, symptoms of poisoning may not appear for some days; this is also the case after the ingestion of contaminated food, which eventually causes a severe gastro-enteritis. The gas produces its effects on the skin within a few minutes in horses, but in cattle, sheep, dogs and human beings effects may not be seen for some hours. On entering the body, the gas combines with the water of the tissues and splits up into inert substances and hydrochloric acid. It is the latter substance which is responsible for the oedema, inflammation, and necrosis of the tissues. The symptoms produced depend largely on the amount of gas which has entered the body, so that exertion on the part of the animals should be avoided as far as possible. Rapid, deep respirations fill the lungs with gas in a short time, and this should be avoided; it is better to drive animals out of an affected area slowly.

Phosgene produces symptoms similar to those of mustard gas poisoning, and Lewisite gives rise to symptoms of arsenical poisoning. Chlorine is not likely to be used, and the tear gases do not have very serious effects.

If possible every farm, and certainly markets, abattoirs and other places where large numbers of animals are likely to be gathered, should be provided with fire-fighting appliances, and the buildings strengthened to resist high explosive bombs. A plentiful supply of bleaching powder should be kept ready for dressing affected animals and for decontaminating the fodder and buildings.—J. A. N.

MATHEWS, F. P. (1937). **Lechuguilla** (*Agave Lecheguilla*) **Poisoning in Sheep, Goats, and Laboratory Animals.**—*Bull. Tex. agric. Exp. Sta.* No. 554. pp. 36. 10 figs., 9 tables. [Numerous refs.]

After a review of the literature on the several photosensitization diseases, a description is given of the symptoms and pathology of naturally occurring lechuguilla poisoning (" swellhead ", " goat fever " or " lechuguilla fever ").

In the experimental production of the disease, sheep and goats were fed on the ground-up green leaves of the plant, or water extracts of them, and exposed to sunlight for regular periods daily. Icterus and liver and kidney lesions similar to those seen in the natural disease were constantly produced, but some difficulty

was experienced in producing the skin and connective tissue lesions of the head.

Experiments on rats fed alcoholic extracts showed that for the production of the complete clinical picture two different agents were necessary, one an unidentified photosensitizer and the other a hepato-nephro-toxin described as a saponin. —F. J. ANDREWS.

ROGERS, C. F., LARSON, A. H., & SPRACHER, M. L. (1937). **Variations of the Hydrocyanic Acid Content of Sudan Grass from a Single Lot of Seed.**—*J. Amer. Soc. Agron.* **29.** 865-876. 3 figs., 3 tables. [7 refs.]

Five acres of land were planted with pure sudan grass seed, and a close study was made of plant variations in the resulting crop, uniform portions of leaves being taken for the estimation of the HCN content. Among the plants of widely different characters produced on the land there was little variation in HCN content, which was not at a dangerous level, and the authors suggest that any intoxication caused in animals by eating sudan grass must be due to some agent other than hydrocyanic acid.—F. J. ANDREWS.

SMITH, W. A., & BRINK, R. A. (1938). **Relation of Bitterness to the Toxic Principle in Sweetclover.**—*J. agric. Res.* **57.** 145-154. 3 tables. [10 refs.]

When common sweetclover (*Melilotus alba*) is stacked at about 50% moisture and allowed to heat, it gives a hay which, when fed to rabbits, induces the symptoms of sweetclover disease found in cattle, the characteristic of which is low blood clotting power. A non-bitter species, *M. dentata*, does not become toxic on being similarly stacked. The clotting power of the blood is not altered by feeding coumarin, the bitter principle, or by spoiled alfalfa hay, but the mixture becomes toxic on being allowed to heat. It is suggested tentatively that coumarin reacts with some other constituent of the plant tissue, giving rise under suitable conditions to the specific substance responsible for " sweetclover disease ". Neither melilotic acid nor coumaric acid will induce the disease. The development of non-bitter forms of sweetclover is suggested for improving the palatability and obviating the disease hazard associated with the feeding of improperly cured hay.—ALFRED EDEN.

THORP, F., Jr., DEEM, A. W., HARRINGTON, H. D., & TOBISKA, J. W. (1937). *Suckleya Suckleyana*, **a Poisonous Plant.**—*Tech. Bull. Colo. agric. Exp. Sta.* No. 22. pp. 19. 10 figs., 3 tables. [3 refs.]

Occasional losses amongst cattle grazing in the plains section of N. E. Colorado were found to be due to ingestion of *S.s.*, a succulent plant growing in water holes and irrigation reservoirs. Analysis showed the plant to be cyanogenetic, with HCN concentrations of from 2-36·4 mg.%. Feeding experiments confirmed the toxic nature of the plant, although under experimental conditions animals refused to eat the plant voluntarily. By force-feeding, the plant was found to be toxic for cattle, sheep, rabbits and g. pigs; symptoms of poisoning appeared rapidly, followed either by death or by quick recovery, depending upon the quantity ingested. The use of $NaNO_2$ and $Na_2S_2O_3$ intravenously brought about rapid recovery in a heifer which was showing signs of HCN intoxication after being forcibly fed with the plant.—ALFRED EDEN.

BESSE. (1938). Empoisonnement par le " N'Daka " (Canthium sp.). [**Poisoning of Cattle by " N'Daka "** (*Canthium sp.*)].—*Bull. Serv. zootech. Epiz. A. O. F.* **1.** No. 2. 30-32.

The poisonous properties of the " N'Daka " tree lie principally in the leaves, which are toxic when green but harmless when dried in the sun. After ingesting

the green leaves, an animal salivates and drinks profusely, locomotion becomes difficult and control of the limbs is lost. Violent colic ensues, accompanied by gaseous indigestion in the rumen ; the pulse is feeble and the respiration accelerated, and the animal may die within 3-4 hours. P.M. examination reveals ecchymoses along the oesophagus, erosion of the rumenal wall with occasional perforations, congestion in the kidneys and liver, and ecchymoses in the endocardium. Native methods of treating these poison cases are described briefly, but no suggestion is made as to the nature of the toxic principles.—Alfred Eden.

Raynor, R. N. (1937). **The Chemical Control of St. Johnswort.**—*Bull. Calif. agric. Exp. Sta.* No. 615. pp. 38. 18 tables. [20 refs.]

The report deals with two years' work with herbicides on plots solidly infested with St-John's-wort. Sixteen different chemicals and six mixtures were employed. The mode of action, methods of application, effectiveness, cost, etc., of the more useful agents are discussed.

" Soil sterilization " by sodium chlorate, borax or both is indicated as the best method of control, and emphasis is laid on the necessity of applying the selected chemicals during definite seasons of the year, depending on the amount and distribution of rainfall.—F. J. Andrews.

PHYSIOLOGY

Burr, H. S., Hill, R. T., & Allen, E. (1935). **Detection of Ovulation in the Intact Rabbit.**—*Proc. Soc. exp. Biol., N. Y.* **33.** 109-111. 1 fig. [2 refs.]

The authors have invented a method of determining the exact time of ovulation in rabbits by the use of a vacuum tube potentiometer which, with a pair of silver-silver chloride electrodes, is capable of registering small changes in voltage between the readings of electrodes in the vagina and on the abdominal wall, the assumption being that the act of ovulation causes electrical changes in the body.

This assumption was verified by applying the apparatus to female anaesthetized rabbits a few hours after mating. The time of ovulation was determined exactly by the fact that it is explosive in character and causes a change in potential of 7,000-20,000 microvolts, shown very clearly by the instrument.—J. E.

Reboul, J., Friedgood, H. B., & Davis, J. (1937). **Electrical Detection of Ovulation.**—*Amer. J. Physiol.* **119.** 387.

The authors have confirmed the observation of Burr, Hill, and Allen [above] that ovulation in the rabbit is associated with a characteristic electrical change.—H. V. Hughes.

Miescher, K., Scholz, C., & Tschopp, E. (1938). **The Activation of Female Sex Hormones. 1. Oestrone and its Esters. The Output of Activity and Efficiency Coefficient.**—*Bio-chem. J.* **32.** 141-148. 4 figs., 2 tables. [16 refs.]

An investigation was carried out on the effect of " activators " such as palmitic acid and stearyl alcohol on the effect of oestrone in the oestrus test in the rat. In addition, the effects of one aromatic and eleven aliphatic esters of oestrone were tested by both the oestrus and the uterus growth tests.

In the oestrus test, castrated rats of 120 g. were used and the determined quantities of the substance administered subcutaneously in two equal doses on consecutive days. Each dose was dissolved in 0·5 ml. sesame oil. It was found that with free oestrone the average threshold value was 0·7γ. With the use of

so-called " activators " the activity of oestrone was increased, *e.g.*, the duration of oestrus with oestrone alone was five days, with oestrone plus 200 mg. palmitic acid, seven days, and with oestrone plus 200 mg. stearyl alcohol, 13 days.

Using the esters of oestrone, the threshold value was found to increase with the aliphatic esters according to the increase in the chain length of acid groups, at first slowly up to the valerate (0·85-1·5γ) and then more quickly up to the palmitate and the stearate (up to 75·0γ). With the lower esters up to the valerate, oestrus appeared as with oestrone after 3-4 days, with higher esters up to the laurate after 4-5 days, and with the palmitate and stearate only after 5-6 days.

It was shown that with oestrone and its lower esters (acetate and propionate) even in high doses (50·0γ), the duration of oestrus amounts to not more than five days. With the higher esters, however, the duration is prolonged so that with *n*-hexanoate and *n*-octanoate in total doses of 50·0γ it lasts 14 days. The palmitate and stearate show no effect at all in doses of up to 50·0γ but in doses of 100·0γ the duration is about 30-40 days respectively. The benzoate lies approximately between the valerate and *n*-hexanoate in effect.

In the uterus growth test, administration was as in the oestrus test the total dose generally amounting to 50·0γ (2 × 25·0γ). The effect on the weight of the uterus of free oestrone in sesame oil subcutaneously is relatively transitory, lasting up to about five days, and not very intense, giving an increase of about 45 mg. in a 50 mg. uterus.

The acetate and propionate give a slight increase in duration and intensity and from the butyrate onwards the increase is more pronounced and is most marked with the *n*-octanoate (giving an increase of about 145 mg. and lasting about 26 days). In this test also the benzoate value lies between those of the valerate and the *n*-hexanoate. It was noted that the maximum value of oestrone and its esters is obtained always on the fourth day.

The authors conclude that a simple observation of the onset of oestrus gives a wrong impression of the relative values of the compounds. When the date of onset was related to the duration of oestrus it was found that the resulting curves closely approximated those obtained from the uterus growth test. By this method of evaluation the output of activity of oestrone amounts to 12·2, of oestrone benzoate to 114·4, and of *n*-octanoate to 185·4 cg.-days.—J. G. Murray.

Hall, Kathleen, & Korenchevsky, V. (1938). **Changes in the Liver of Male Rats after Castration and Injections of Sexual Hormones.**—*Brit. med. J.* Feb. 26th. 438-441. 2 tables. [16 refs.]

In this investigation 51 normal rats and 130 male rats castrated before puberty were used. It was found that in normal uninjected animals the weight of the liver per unit body weight decreased with age. At the age of 70 days or more the weight of the liver of castrated rats was less than in normal ones. Histologically the only change visible was a slight decrease in the size of the lobules. Injections of androsterone, androstenediol, transdehydroandrosterone, testosterone, and testosterone propionate caused the return of the liver of most castrated rats towards or to normal weight and structure. Testosterone and testosterone propionate had no effect on the liver of normal rats.

The absence of pathological changes in the livers of the castrated rats both before and after administration of the above male sex hormones suggests that the latter have a stimulating action on the liver. The authors suggest that this might have a practical significance in therapy if these effects could be reproduced in man.

Oestrone and oestradiol caused decrease in weight of liver of castrated rats. There were no pathological changes.—J. G. Murray.

I. Dodds, E. C., Lawson, W., & Noble, R. L. (1938). **Biological Effects of the Synthetic Oestrogenic Substance 4 : 4′ Dihydroxy-α : β-Diethylstilbene.**—*Lancet.* **234.** 1389-1391. 2 figs. [2 refs.]

II. Folley, S. J., & Watson, Helen. (1938). **Some Biological Properties of Diethylstilboestrol.**—*Ibid.* **235.** 423-424. 2 figs., 1 table. [10 refs.]

I. The substance had an action similar to that of oestrone on the uterus of ovariectomized rats, on the mating reaction, vagina and uterus of immature rats, on the uterus of immature rabbits, and on the feathers of capons. By vaginal smear assay on ovariectomized rats, it was about 2½ times as active as oestrone. It produced nipple growth in the g. pig.

II. It was found that diethylstilboestrol (1) partially inhibited the response of the pigeon crop-gland to prolactin ; (2) inhibited lactation in the rat, and (3) produced a temporary increase in the phosphatase content of cows' milk, accompanied by more prolonged increases in both the fat and non-fatty solids content. The latter effect was in part due to an increase in the lactose content, which suggests that the treatment does not induce a change from normal milk to a colostral type of secretion. In all these respects the action of a diethylstilboestrol qualitatively resembled that of natural oestrogens.—J. M. Robson.

Pinteaux, M. (1938). Rapports de la vitamine E avec les hormones sexuelles.—[**Relation of Vitamin E to Sex Hormones**].—*Rec. Méd. vét.* **114.** 469-475.

Certain workers have claimed that wheat germ oil possesses properties which produce a cycle of changes in the sexual apparatus similar to that produced when anterior pituitary hormone is injected into immature female animals. It would appear fairly clear that vitamin E has no direct oestrogenic action. P. suggests that its alleged effect must, therefore, be due to increased production of anterior pituitary hormone arising as a result of wheat germ oil administration. P's observations on various species support the more widely held view that vitamin E has no gonadotropic properties, and that vitamin E, therefore, cannot be substituted for anterior pituitary hormone in cases of sexual abnormality due to dysfunction of the anterior pituitary gland.—N. J. Scorgie.

Kustallow. (1937). Reaktion zur Bestimmung normaler und ektopischer Schwangerschaft mittels Infusorientierchen. [**A Pregnancy Test Using Infusoria**].—*Zbl. Gynäk.* **5.** 569-573.

K. found that living paramecia in a hay infusion were killed within five minutes if pregnancy urine was added, and that they survived for much longer than five minutes with non-pregnancy urine. In practice, one drop each of hay infusion and urine are placed on a slide and examined microscopically. Reliable diagnostic results are claimed.—J. E.

Gettkandt, A. (1937). Trächtigkeitsnachweis beim Rind durch Einwirkung von Harn auf Paramäcien. (Kustallowsche Reaktion). [**Application of Kustallow's Test for Pregnancy in Cattle**].—*Dtsch. tierärztl. Wschr.* **45.** 783-785. 3 tables. [4 refs.]

G. carried out this test [see above] on 71 slaughter cattle, and states that his diagnosis was correct in 94% of cases.—M. F. Benjamin.

Nicolau, S., & Kopciowska, L. (1938). " Inclusions " cellulaires acidophiles dans le tissu nerveux et dans le rein des pigeons " normaux ". [**Acidophilic Cellular Inclusions in the Nerve Tissue and Kidney of Normal Pigeons**].—*Ann. Inst. Pasteur.* **60.** 308-315. 7 figs. [5 refs.]

Inclusion bodies having a resemblance to Negri bodies or Joest-Degen cor-

puscles, were found in the kidneys and brains of " normal " pigeons. They were sometimes accompanied by mononuclear perivascular infiltrations in the spinal ganglia and in the nerve tracts. The authors postulate that these bodies represent the reaction of an unidentified virus which induces an inapparent form of disease. [A similar theory was advanced with regard to inclusion bodies found in " normal " dogs—*V. B.* **7.** 178].—R. E. Glover.

Bond, C. J. (1938). **On Certain Phases in the Life History of the Polymorph Leucocyte. The Influence of Cell Activity on the Number and Arrangement of the Nuclear Lobes.**—*Brit. med. J.* Aug. 6th. 281-282. 3 charts. [8 refs.]

B. propounds the view that the number of nuclear lobes in the polymorphonuclear leucocyte is related to the activity of the cell, rather than to the age of cell as has been generally accepted. By comparing the total number of nuclear lobes in 100 cells in the same individual's blood, taken at the same time, (a) in the normal blood film, (b) in the same blood after incubation, and (c) in the same polymorphonuclear leucocytes incubated after standing at room temperature for six hours, he was able to demonstrate an increase in the total number of nuclear lobes. —D. L. Hughes.

Hamburger, C. (1938). **How Early Can Anti-Gonadotropic Hormone be Demonstrated ? (Experiments with Rabbits Treated with Mare Serum Hormone).** —*Acta path. microbiol. scand.* Suppl. No. 37. pp. 224-235. 4 figs., 2 tables. [4 refs.] [In English].

H. found that the weight of the ovaries of rabbits treated with 100 mouse units of mare serum hormone per day increased up to one hundred-fold or more during the first 18 days of treatment, but subsequently decreased, in spite of treatment continued beyond this time. In investigating the causes for this regression in weight, it was found that anti-gonadotropic hormone against mare serum hormone appeared as early as the ninth or tenth day of treatment, and that in 19-32 days sufficient was present in 1 c.c. of the rabbit's serum to inhibit 25 mouse units of mare serum hormone.—N. J. Scorgie.

Bayer, G., & Wense, T. (1937). Zur Frage Nebenniere und Infektion. [**The Adrenal Glands and Infection**].—*Wien. klin. Wschr.* **50.** 682-683. [Numerous refs.]

A short survey of the literature showing the importance of the adrenal glands in resistance to infection and in maintaining the level of the body salt in acute infections. Loss of the adrenals quickly led to loss of the body salt, but this process can be reversed by dosing with adrenal extract. Fever results in the loss of salt, which loss is resisted by the adrenals. The authors suggest that the administration of salt and adrenal extract may be valuable in the treatment of infections. —J. E.

Negri, R. (1938). Ormoni sessuali e diagnosi di gravidanza nella cavalla. [**Hormonal Diagnosis of Pregnancy in Mares**].—*Profilassi.* **11.** 107-110.

N. gives a short description of the functions of the various sex hormones and of the technique of the so-called pregnancy tests. Non-pregnant mares excrete 600-3,200 mouse units of oestrone in their urine ; the amount rises slightly during oestrum and steadily increases during pregnancy to a maximum of 888,000 M.U. This point is reached about the 248th day of gestation. All the biological methods, particularly Friedman's test, appear excellent for the diagnosis of pregnancy in

mares and asses. Serum as well as urine must, of course, be provided. Cuboni's test is very reliable after the fourth month of pregnancy. It is impossible to diagnose pregnancy in cows at an early stage by any of the tests at present in use. [No new material is given].—J. A. NICHOLSON.

TECHNIQUE AND APPARATUS

FOLEY, H. (1938). Techniques de prélèvements de laboratoire et de récolte de matériaux de parasitologie et d'histoire naturelle. [**Laboratory Equipment and the Collection of Biological Specimens**].—*Arch. Inst. Pasteur Algér.* **16.** 54-104. 18 figs., 3 plates. [14 refs.]

F. enumerates precautions necessary for the care of the microscope in the tropics, with a list of essentials for adequate microscopic technique as well as for the preparation of slides and stains. After directions regarding the labelling and dispatch of samples, details are given concerning the collection of blood samples in man, large and small mammals, birds and cold-blooded animals. There follows the preparation and staining of thick and thin blood films, with packing methods and postal regulations. Laboratory technique is described for leucocyte counts, sternal puncture for sampling bone-marrow, samples of sputum, pus, conjunctival secretion and faeces (for the presence of cysts, eggs, etc.). Specimens from ringworm and tumours are next considered. Details are given concerning the collection of zoological and botanical specimens.—R. O. MUIR.

ELLIOTT, S. D. (1938). **The Use of Saponin in Blood Culture Media, with Special Reference to Blood Cultures in Subacute Bacterial Endocarditis.**—*J. Path. Bact.* **46.** 121-131. 9 tables. [2 refs.]

In blood culture work with cases of slight infection, it may happen that leucocytes in the drawn blood phagocytoze the few bacteria present and so give rise to a negative result. To overcome this, E. introduced saponin into blood culture samples and found that in a concentration of 0·033% in a citrate blood-broth mixture containing 16% of blood and 0·17% of sodium citrate it caused lysis of both red and white blood corpuscles, with a consequent rise in the number of positive culture tests for streptococci.—J. E.

MÜLLER, A. (1937). Einfache Anaerobenzüchtung in Kulturschalen und Reagenzglasern. [**Single Anaerobic Culture in Plates and Test-Tubes**].—*Zlb. Bakt. I. (Orig.).* **140.** 66-69. 2 figs. [1 ref.]

A thick disk of a mixture of kieselguhr, gypsum and pyrogallol is secured by heat to the lid of a Petri dish, which is then placed over the other half of the dish, which was previously sown. 2 c.c. of 80% K_2CO_3 solution is spread over the kieselgur plate before use. The lid is then cemented on to a glass plate to make the culture airtight. In the case of test-tubes, plugs prepared in the same way are used and the opening is sealed.—M. F. BENJAMIN.

WEINECK, E. (1938). Ueber das Verhalten des filtrierbaren Virus (Hühnerpest, Maul- und Klauenseuche) im Gewebe von Hühnembryonen. [**Behaviour of Fowl Plague and Foot and Mouth Disease Viruses on Fowl Embryo Tissue Culture**].—*Zlb. Bakt. I. (Orig.).* **141.** 14-21. 2 figs. [15 refs.]

Cell-free filtrates of infected brain did not infect the egg embryos, but this was done by unfiltered brain. The virus was passaged through eggs up to 42 times and retained its virulence throughout. It had a damaging effect on the

vessels of the allantois, resulting in the death of the embryos. On histological examination the ectoderm and mesoderm of the allantois were found to be thickened and invaded by erythroblasts, but the endoderm was unchanged. The vessels of the allantois were filled with normoblasts and surrounded by cell debris, and the endothelial cells were swollen and destroyed. Similar experiments with F. & M. disease virus were negative ; there was no infection of the embryo and no increase in the virus. The technique adopted was similar to that of BURNET [see also *V. B.* **7.** 525.], which was as follows :–

" The first stage in inoculating the egg is to cut through the shell [with] a dental engine fitted with a thin cutting disc. . . . In cutting the shell, care must be taken to avoid damaging the underlying shell membrane. . . . After making the triangular cuts two small intersecting cuts just sufficiently deep to penetrate the hard surface of the shell are made in the centre of the area corresponding to the air space. . . .

For the actual inoculation, a small hole is first drilled into the air space with the egg piercer, a short length of steel rod about 2·5 mm. in diameter with a four-sided point. The triangle of shell is removed with a straight cutting-edged needle mounted on a suitable handle. A slit is now made in the shell membrane running in the direction of its fibres, *i.e.*, obliquely transverse. This procedure is the only part of the technique which can be regarded as of some difficulty. The chorioallantois lies immediately beneath the shell membrane, and is easily pierced by the needle point. . . . Properly done, this should result in the production of a little wedge of air between the lifted edge of the shell membrane and the chorioallantois. If this is present, slight suction with a rubber teat on the opening into the air space will result in the egg contents being displaced into the air space with the development of an artificial air space between the shell membrane and the chorioallantois. . . .

Once the chorioallantois has fallen away, the slit can be enlarged as desired. If a measured amount of inoculum is to be used, an opening large enough to allow free entry of a capillary pipette without touching the sides should be made. About 0·05 c.c. of the material to be inoculated is taken up in a sterile Pasteur pipette and blown gently on to the chorioallantois. The egg is then labelled with pencil, and the openings sealed. A rim of paraffin-vaseline mixture is built up round the triangle from a Pasteur pipette filled with the heated material, and a warm coverslip placed over the opening ".—SASSENHOF (MUNICH).

GOODPASTURE, E. W. (1938). **Some Uses of the Chick Embryo for the Study of Infection and Immunity.**—*Amer. J. Hyg.* **28.** 111-129. [Numerous refs.] [See also *V. B.* **7.** 525].

The technical researches which have led up to the use of chick embryos for the study of infectious diseases are discussed, and the modern technique of inoculating eggs is outlined.

In discussing the objects and uses of egg embryos it is stressed that many of the viruses which infect man and animals have been cultivated in this way, the rickettsia of Rocky Mountain spotted fever has been successfully grown, and likewise a number of pathogenic bacteria including *Haemophilus influenzae* and *H. pertussis* (causal organism of whooping cough).

Among the advantages which egg embryos offer over other laboratory methods of study is the fact that a fertile egg is no more expensive than a test tube of medium. Moreover, the technique of inoculation is by no means difficult, and is one which is easily acquired by practice. The growth which occurs in the egg, having taken place in the presence of living tissue, approximates closely to the type of growth occurring under natural conditions of infection. Furthermore, the cellular reaction of living tissue to this growth can also be studied, particularly if care is taken to inoculate the organisms into that layer which constitutes the optimum growth medium.—E. J. PULLINGER.

HIMMELWEIT, F. (1937). **Fluorescence Microscopy on Living Virus with Oblique Incident Illumination.**—*Lancet.* **233.** 444-445. [Copied *verbatim* from *Bull. Hyg., Lond.* **12.** 909. Signed G. S. WILSON].

In fluorescence microscopy two methods of illuminating the object are avail-

able. The first is by means of a suitable substage condenser; the second is by oblique incident illumination. In the second method, which is described here, an arc, a Leitz-Ultropak outfit, and a collecting lens made of crown glass were used, which with suitable filters provided a beam of ultra-violet light ranging from about 3,500 to 4,000 A.u. The chorio-allantoic membrane of developing chicks, infected with a suitable virus, was examined. The membrane was brought into immersion contact with the underside of a cover slip without altering its normal structure. To obtain differentiation the membrane was treated with primuline or with Titan yellow 2 GS, which fluoresced brilliantly. Examination of egg membranes infected with ectromelia virus revealed the inclusion bodies as mauve structures within pale blue cells against a violet background of normal tissue. With the highest N.A. objectives elementary bodies could be distinguished in the inclusion bodies as bright blue particles on a mauve background, which represented the matrix. In vaccinia-infected membranes light blue elementary bodies could be made out vibrating actively against a mauve background.

Ecker, E. E., & Pillemer, L. (1938). **An Inexpensive Method for the Dehydration and Preservation of Complement and Other Biological Materials.**—*Amer. J. publ. Hlth.* **28.** 1231-1232. [9 refs.]

The apparatus consists of a high vacuum pump connected to a one gallon size aspirator bottle which serves as a trap, and an ordinary vacuum desiccator. The desiccant used is barium oxide, 30 g. being sufficient to dry 1 c.c. of fresh serum. The sera are frozen in a dry-ice bath with alcohol, acetone or kerosene, the vials are dried and placed in the desiccator and the pump is started at full capacity. The period of drying varies from 12 to 18 hours, depending on the quantity of materials used. When the operation is completed the vacuum is released slowly and the vials are immediately stoppered with rubber stoppers.—R. Allcroft.

Asheshov, I. N. (1938). **A Simple Method for the Sterile Filtration of Small Amounts of Fluid.**—*J. Bact.* **36.** 197-199. 1 fig. [2 refs.]

A miniature candle of the Chamberland series is fitted to the tapered end of a 10 or 20 c.c. transfer pipette by means of thin rubber tubing, and the connexion sealed with a watery emulsion of latex to prevent leakage. After shortening of the upper end of the pipette to about 3 in., the mounted candle is placed in a long test tube and sterilized in the autoclave. When required for use the candle is immersed in the fluid to be filtered and suction applied to the end of the pipette by a vacuum pump or a compressed rubber bulb. When sufficient filtrate has appeared in the bulb of the pipette it is disconnected and the filtrate withdrawn with a Pasteur pipette. About 10 c.c. of sterile filtrate can be obtained in five minutes.—R. Allcroft.

Lins, A. E. E. (1936). Ovohelmintoscopias. [**Search for Worm Ova in Faeces.**] —*Boletim da Secretaria Geral de Saude e Assistencia.* **2.** 83-93. 8 figs. on 5 plates. [English summary]. [Copied *verbatim* from *Trop. Dis. Bull.* **35.** 216. Signed H. H. S.]

The author employing the technique described below states that he obtained much better results from direct examination than by ordinary methods [he does not compare his with the more highly concentrating methods of Clayton Lane, and others].

He employs an " enrichment fluid " composed of acetic acid 5 c.c., formol 10 c.c., hydrochloric acid 75 c.c. and distilled water 110 c.c. and the steps of the procedure are as follows :

One c.c. of the enrichment fluid is placed in a conical glass with an equal amount of faeces and the two mixed with a glass rod to a uniform suspension, after which the reagent is added slowly to 20 c.c. and after rapid stirring with a glass rod is transferred to a centrifuge tube and spun for two minutes : the supernatant fluid is decanted and the deposit spread with a pipette on a slide and examined.

Among the advantages claimed for this method are that the morphology of eggs and larvae is not altered, that the specimen keeps well for demonstration purposes, and gives a higher percentage of positive findings, 40 per cent., as compared with an average of 12 per cent.

ARTIGAS, P. DE T. (1936). **Mounting of Helminths and Small Arthropods. A New, Simple and Efficient Method.**—*Mem. Inst. Butantan.* **10.** 71-75. 10 figs. on 4 plates. [Portuguese version pp. 65-70]. [Copied *verbatim* from *Trop. Dis. Bull.* **35.** 216-217. Signed C. LANE].

" In this paper a new method is described for toto-mounting nematodes. This new method can also be used with plathelminths and small arthropods.

" The mounting medium is obtained by dissolving mastic resin (from *Pistacia lenticus*) in creosote [beechwood creosote].

" This mastic-creosote fluid is prepared as follows :

" 30 c.c. of 95 per cent. alcohol are added to 10 gm. of pulverized mastic. The mixture is left in an incubator at 55°C., for 24 hours. Then, the alcoholic mastic is taken off and, after cooling centrifuged. The sediment is then poured off by decantation and, if necessary, the fluid is centrifuged once more.

" 30 c.c. of pure creosote are added to the alcoholic mastic and the whole mixture is placed in the incubator at 55° until complete evaporation of the alcohole The resulting fluid, which is clear and sirupy, after solidification takes a yellowish. coloration.

" A very simple mounting technic has thus been adopted :

" 1. Treatment with acetic acid. The length of time required varies according to the thickness and size of the nematode and is completed with its clearing.

" 2. Treatment with creosote. In this substance remains the nematode until fully impregnated. There is no harm to the specimen in prolonging this step for some hours.

" 3. Mounting between slide and cover-slip in mastic-creosote fluid.

" 4. Hardening of the mounting medium in the incubator at 50°C.-55°C.

" In order to obtain coloured preparations, the material must be treated with hydrochloride carmine or Semichon's acetic carmine (prepared according to Langeron's indications). The staining precedes the other steps of the mounting technic. Overstaining differentiation is done by means of hydrochloric water or hydrochloric alcohol."

[Presumably glacial acetic acid is intended.]

MISCELLANEOUS

GREAT BRITAIN. (1938). **Report of the Committee on Veterinary Education.** pp. 124. 10 appendixes. London : H. M. Stat. Off. [8vo].

The Committee was first appointed on the 3rd November, 1936, and its function was defined as :–

" To review the facilities available for veterinary education in Great Britain in relation to the probable future demand for qualified veterinary surgeons and to report thereon, and

in particular to make recommendations as to the provision which should be made from public funds in the five years 1937-42 in aid of the maintenance expenses of institutions providing veterinary education."

The committee conducted an extensive enquiry and published the following conclusions and recommendations :–

" 1. A well-trained veterinary profession is an important factor in national wealth, security and health. The annual loss from diseases in farm-livestock in the United Kingdom is established at about £19,000,000 (paras. 1-6).

2. The State has not contributed liberally to the training of the profession. Veterinary education has been starved. The Veterinary Schools are overcrowded ; teaching staffs are inadequate and in some instances poorly paid ; facilities for clinical and practical training are insufficient. If defects are to be made good, considerable expenditure must be faced. The system of education and courses of study also need amendment (paras. 7-10).

3. The annual demand for newly qualified veterinarians is estimated at about 150 during the quinquennium (1937-8 to 1941-2) and thereafter at about 115. The growth of demand has, however, exceeded expectations in the past and may do so again (paras. 16-18).

4. There are at present four teaching Schools in Great Britain—at London, Edinburgh, Glasgow and Liverpool. The University of Cambridge is also preparing to participate in veterinary education (para. 20).

5. The four Schools, and a School in Dublin, are affiliated to the Royal College of Veterinary Surgeons. The College does not teach, but examines, gives the licence to practise and is a disciplinary body. While it has no direct control over the Schools it exercises indirect control through its examinations. The Schools have no right of representation on the Council or Examination Committee of the R.C.V.S. (paras. 21 and 22).

6. The relationship of the Schools to Universities varies. The London School is loosely connected with London University as an institution having recognised teachers. The Edinburgh School is affiliated to Edinburgh University and the connection between the two is fairly close. The Liverpool School is a Department of Liverpool University. At these three Schools an increasing proportion of the students reads for Degrees as well as for the Diploma of the R.C.V.S., but the additional cost of tuition and examination fees is onerous. The Glasgow School has University representatives on its Governing Body, but no other connection with the University. At Cambridge it is proposed that students shall graduate with Honours and then proceed for two years to one of the Veterinary Schools (para. 22).

7. The whole lay-out of veterinary education is disjointed and unsystematic. A more organic connection is needed between the Schools, the Universities and the R.C.V.S. (paras. 23-25).

8. Veterinary education should be brought into closer connection with Universities. Students should have an opportunity of taking a Degree in science on their way to the professional qualification without loss of time or heavy additional fees. The Universities at Edinburgh, Glasgow, London and Liverpool are invited to consider the institution of a Degree obtainable by veterinary students in the first three years of their course after study of the subjects as given in our amended curriculum for the corresponding M.R.C.V.S. examinations. Success in the Degree examinations should exempt from the corresponding examinations of the R.C.V.S. (paras. 26 and 27. See also Chapter VIII).

9. The R.C.V.S. should be given power to include on its Council and Examination Committee representatives of the affiliated Veterinary Schools and of the five Universities of Cambridge, Glasgow, Edinburgh, London and Liverpool ; to send observers to examinations which exempt from its own examinations ; to inspect facilities for training in animal husbandry and clinical subjects ; to require from candidates for membership periods of residence on farms and with veterinary practitioners ; and to appoint as full examiners for its examinations Members of the Council and teachers in the affiliated Schools (para. 29).

10. The Act or Charter reconstituting the Council of the R.C.V.S. should provide that no further University in the United Kingdom shall be represented on the Council ; aid from public funds should not be made available for veterinary teaching by any further Universities (para. 29).

11. The R.C.V.S., the Universities and the Veterinary Schools should consult together at an early date with a view to the elaboration of a scheme for carrying into effect such of these recommendations as require agreement and joint action ; and the Government should initiate such legislation as may be necessary to give effect to these recommendations (para. 29).

12. The above recommendations provide a solution to most of the difficulties associated with the present one-portal system of entry into the profession, and one well suited to present conditions (para. 30).

13. A sufficiency of senior posts, preferably Chairs, should be created to encourage the several branches of veterinary science (para. 28).

14. The veterinary curriculum should be reorganised so as to secure such an arrangement of the subjects that the student is taken from one to another in logical sequence and that the first three years are devoted to a combination of scientific studies on which Universities may award degrees. The proposed curriculum is set out in detail with corresponding examinations (paras. 41-46).

15. The veterinary surgeon of the future will be more and more concerned with the maintenance of stock in health and not purely with their restoration to health. A pupilage of at least six months on a farm at varying seasons of the year should be required as a foundation of a more practical training in animal husbandry. For this training itself a Field Station of about 100 acres, at which the different kinds of livestock are kept, should be attached to each School. More attention should also be given to clinical study of farm livestock, and for this purpose a sufficient supply of clinical material must be available ; the lack of such material is at present a serious defect in training. Each School should possess an adequately equipped and staffed hospital for large animals, and such a hospital is best situated in the country adjoining the Field Station. The co-operation of practitioners should be sought in securing the needed supply of sick animals. In addition, a period of at least six months with a veterinary practitioner should be made compulsory for each student (paras. 31-40).

16. The situation of none of the Schools is ideal. The Schools in Camden Town, Liverpool and Edinburgh (which are at present grant-aided) must, however, remain where they are. To maintain the required output of qualified persons a fourth School is necessary because these three Schools cannot efficiently accommodate the number of students required to produce this output, and cannot be expanded, at Liverpool on account of local conditions, in London and Edinburgh without exceeding the proper maximum size of a Veterinary School dictated by the requirements of clinical instruction. The best location for a fourth School is at Glasgow, and a complete reorganisation and rebuilding of the Glasgow School is recommended (see Chapter XV). All four Schools together with a proposed scheme of pre-clinical veterinary studies at Cambridge University should be reorganised for aid from the Exchequer (paras. 48-54).

17. The maximum number of students at the Schools should be reduced by the end of the quinquennium to the following : Camden Town 250, Liverpool 125, Edinburgh 225, and Glasgow 200, post-diploma students and Cambridge graduates coming for clinical training to be supernumerary to these quotas. Should future demand require it, some possible expansions in these numbers are indicated to provide for an additional 100 students in all (paras. 52 and 53).

18. The quality of the teaching in the Schools is in many ways most unsatisfactory : this is mainly due to understaffing. The scales of salary are in some cases too low in comparison with those of the State Veterinary Service and of other veterinary posts (para. 55).

19. *Royal Veterinary College and Hospital.*— A Field Station in the country, including a hospital for large animals, is necessary ; the capital cost is estimated at approximately £42,000 and a Government grant is recommended towards this cost. Schemes of staffing and salary scales are recommended ; a block grant of £25,000 per annum is required in respect of the maintenance of the School during the quinquennium ; and an additional maintenance grant will be needed on the establishment of the Field Station and hospital for large animals (paras. 56-62).

20. *School of Veterinary Science, Liverpool University.*—This School should be developed as a School with special facilities for training in the treatment primarily of cattle and secondarily of other farm animals and poultry. The capital cost of the Field Station and hospitals for large animals which are necessary is estimated at £36,000. The present veterinary buildings in Liverpool should be demolished and a new building erected on the present site, with extensions : the cost of the rebuilding scheme is estimated at £100,000. A Government grant is recommended towards the capital cost of the Field Station and the rebuilding of the main block of the School in Liverpool. Schemes of staffing and salary scales are recommended ; a block grant of £8,000 per annum is required during the quinquennium and this will need to be increased when the Field Station is established and the School is rebuilt (paras. 63-80).

21. *Cambridge University.*—A scheme of pre-clinical and post-clinical training at this University is recommended for Government aid. The capital cost of the scheme is estimated at £10,100 but might in certain eventualities be £16,600, towards which the University can find £4,500 ; a Government grant in respect of the balance of the cost is recommended. As regards maintenance costs, deficiency grants assessed departmentally are recommended up to a maximum of £900 per annum in respect of the undergraduate course and up to a maximum of £550 per annum for the Diploma course (paras. 81-88).

22. *The Royal (Dick) Veterinary College, Edinburgh.*—Recommendations are made regarding an extension of the Clinical Department of the School and other improvements

of a capital nature. These will involve an increase of £36,000 in the capital cost of a building scheme previously estimated at £40,000, for which a grant on the £ for £ basis up to £20,000 from the Development Fund has been offered. A Government grant in respect of this increased cost is recommended. It is hoped that in due course a Field Station will be provided as recommended for other Schools, and any application of the School for this purpose should receive sympathetic consideration. Schemes of staffing and salary scales are also recommended. A block grant rising to £14,000 per annum during the last three years of the quinquennium is required (paras. 89-95).

23. *The Glasgow Veterinary College (Incorporated).*—A complete reorganisation and rehousing of this School are recommended, the University of Glasgow becoming responsible for the first three years of studies, whilst the subjects of the fourth and fifth years would be taught under the direction of the Governors of the existing College in new buildings on the outskirts of the City. A joint Board of Veterinary Studies is suggested. On condition that such a reorganisation is effected, a resumption of State assistance is recommended as from 1940-1. The capital costs of reconstruction are estimated at £40,000 for the additional buildings required at the University for the teaching of anatomy, physiology and pathology, and £39,400 for a Field Station and hospital for large animals on the outskirts of the City for the teaching of animal husbandry and clinical subjects. Grant is recommended in aid of this capital scheme. A recurrent grant of the order of £12,900 per annum in the years 1940-1 and 1941-2 is recommended for maintenance (paras. 96-101).

24. In all, a capital expenditure of £299,000 and recurring grants rising to £61,350 are involved in the above recommendations and some further small grants will be necessary when the Field Stations at London and Liverpool are ready for occupation. The various improvements in veterinary education which are recommended form parts of a balanced plan, the full benefit of which will be lost if the building programme is not carried out. The £ for £ principle for capital grants from the Government should not be insisted on. It should, however, be possible to raise locally part of the cost of the out-station at Glasgow. If effect is given to the proposals the cost to the State of veterinary education will be less per student than in some continental countries and the outlay would be well justified (para. 102).

25. The value of advanced post-diploma courses, particularly the F.R.C.V.S., is emphasised. The D.V.S.M. has a useful place in the scheme of veterinary education and its disappearance would be unfortunate (para. 103).

26. Refresher courses for veterinary practitioners are necessary in view of the rapid advances in scientific knowledge. They should be given at Veterinary Schools and should cover a few subjects only at a time (para. 105).

27. A scheme for special courses of instruction in poultry disease control and poultry husbandry to be given jointly at Liverpool University and Harper Adams Agricultural College is approved; and grants are recommended of £300 to cover the expenditure on initial equipment, and not exceeding £750 per annum towards the net maintenance expenditure. It is also desirable that shorter intensive courses should be provided for busy veterinary practitioners who are unable to undertake a course of the length of the above joint course (paras. 106-108).

28. The veterinary student is more likely to be successful if he comes from the farm or is the son of a practising veterinary surgeon than if he is town bred (paras. 11-15). In the admission of students preference should be given by the Schools *ceteris paribus* to students who come from farms or are the sons of practitioners; in selecting town-bred students, preference should be given *ceteris paribus* to those who have acquired experience on farms before applying for entry (para. 109). The number of women students admitted by the Schools should be small (para. 110).

29. Fees for the M.R.C.V.S. course should be not less than £40 per annum in the English and £35 per annum in the Scottish Schools. Students should make their own arrangements for payment of fees to private practitioners and farmers (para. 111).

30. Teachers in the Schools should have time for research. Such research should be of a fundamental and disinterested nature undertaken for the advancement of basic knowledge. Training of research workers is a post-diploma matter; existing schemes of post-graduate research scholarships are commended (paras. 112 and 113).

31. The Schools should not relax their efforts to secure additional income from other than State sources; some possible sources of income are indicated (para. 114).

32. A special enquiry on unqualified practitioners should be instituted by the Government (paras. 115-118)."

[An extensive commentary on this report has appeared in the *Veterinary Record*, beginning on October 1st, 1938, and ending on December 31st, 1938].

LORD HAILEY. (1938). **An African Survey. A Study of Problems Arising in Africa South of the Sahara.** pp. xxviii + 1837. 17 tables, 6 maps. London: Oxford University Press. [8vo].

This monumental work was produced as a result of the labours of the African Research Survey Committee since 1933.

It was found necessary to place some limitation on the extent of the work involved. Consequently it was decided in the first place to confine the survey to that part of Africa which may be roughly described as lying south of the Sahara.

The book is divided into twenty chapters each dealing with special subjects; the chapters on the Physical Background, the African Peoples, the State of the Land, Agriculture, Forests, the Problem of Water Supply, Soil Erosion, Health, Economic Development, and Transport and Communications are of special interest to readers of this *Bulletin*. In the final chapter, covering 27 pages, conclusions are given *seriatim* of the matter dealt with in the earlier chapters on special subjects. There is an excellent index.

All interested in African conditions should possess this book.

WORTHINGTON, E. B. (1938). **Science in Africa. A Review of Scientific Research Relating to Tropical and Southern Africa.** pp. xiii + 746. 8 plates, 5 maps. London: Oxford University Press. [8vo].

This book is complementary to Lord Hailey's survey, and deals with scientific work carried out in Africa.

The work is dealt with in eighteen chapters, of which those on Some Problems of Research, Soil Science, Botany, Forestry, Zoology, Entomology, Agriculture, Animal Industry, Health and Medicine, Human Disease, and Health and Population are of special interest to our readers.

Animal diseases are dealt with chiefly in the chapters on Entomology and Animal Industry. There are valuable bibliographies to most of the subjects discussed, and there is a good index. This book should be in the possession of all interested in African conditions.

ANON. (1938). **Tabulation of Post-Mortem Results.**—*Brit. med. J.* April 2nd. 740-741.

The system of tabulating the results of autopsies at the Adelaide hospital is referred to, and its potential importance in linking up diseases by records of lesions associated with them is emphasized.

A summary of the results of each autopsy is written out and indexed under appropriate headings on cards, which are arranged in groups and published on the completion of every thousandth autopsy. In this way the full P.M. findings of each case affected with any particular organic disease may quickly be seen, and much can be learnt from a study of the records.—J. E.

—. (1938). L'istituto zooprofilattico sperimentale di Brescia. [**The Animal Disease Institute at Brescia**].—*Azione vet.* **7.** 262-264. 3 figs.

Founded in 1922, and much cramped in its first years, the Institute later gained local support and has expanded considerably. Diagnostic examinations carried out increased from 276 in 1922 to 3,857 in 1936 and in that year curative symptomatic treatment for foot and mouth disease was given by the institute staff to 20,000 swine, to 5,040 bovines and to 2,500 cattle.

Sera and vaccines are prepared, and some 1,500 carcasses are examined bacteriologically each year, about 10% being condemned [? abattoir inspection;

no details given]. Good results are claimed in the sphere of bovine sterility, and a special training course on this subject is given to veterinarians. Virus and serum against swine fever were produced, and since 1934 the Institute has been the source of supply for all Italy, results being very satisfactory.

Agricultural Research Council. (1938). **Dairy Research.** pp. 101. 5 tables, 1 map, 2 appendixes. [12 refs.] London: H.M. Stat. Off. [8vo] [2s.]

This publication is a review of some of the most important aspects of dairy research, compiled by the Agricultural Research Council as a result of visits to centres and interviews with various workers. The chief research centres visited were :– The National Institute for Research in Dairying, Reading, The Hannah Dairy Research Institute, Ayr, the West of Scotland College of Agriculture, the East of Scotland College of Agriculture, the University of Manchester, and the laboratories of United Dairies Ltd.

The work already done at each centre is noted, together with programmes that will be undertaken. A wide field is covered by the institutes, including such subjects as tuberculosis, mastitis, contagious abortion, pasteurization, bacterial content of milk, the protein requirements of cows, grass drying, and the purification of milk factory effluents.—H. E. Bywater.

Cottier, H. (1937). L'élevage en Tunisie. [**Animal Husbandry in Tunisia**]. pp. 10. 5 figs., 1 table, 1 graph, 1 map. [6 refs.] Paris: Institut de l'encyclopédie coloniale et maritime. [fcp].

The general conditions of animal husbandry in Tunisia are reviewed, and a census of the livestock population is given. A brief reference is made to the work of the Institut Arloing, the veterinary laboratory for Tunis.—N. J. Scorgie.

Kon, S. K. (1938). **Biennial Reviews of the Progress of Dairy Science. Section D. The Nutritional Value of Milk and Milk Products.**—*J. Dairy Res.* **9.** 242-262. [Numerous refs.]

These reviews should be read in the original. The section is divided into :– (1) nutritional value of milk as estimated in laboratory and field experiments, and (2) nutritional value for human beings. Under the second heading heated milk and irradiated and vitaminized milk are dealt with.

Anon. (1938). **Explosions in the Operating Theatre.**—*Lancet.* **234.** 561. [2 refs.]

An editorial on the danger of using potentially explosive mixtures (oxygen, ether, etc.) for general anaesthesia. Explosive mixtures can be ignited by static electricity produced in metal furniture, etc., such as is used in operating theatres ; this can be guarded against by earthing the table if the floor is an electrical conductor and by maintaining a humid atmosphere (<65 % saturation) in the room. —J. E.

OFFICIAL AND OTHER REPORTS

Great Britain. (1938). **Report of the First Imperial Veterinary Conference. 15th-18th August, 1938.** pp. 97. 2 tables, 3 appendixes. Weybridge: Imperial Bureau of Animal Health. [4to] [5s.]

The first Imperial Veterinary Conference was held at the Royal Veterinary College, London on August 15th-18th, 1938, and the report has just been issued. It was attended by delegates from the United Kingdom, from each of the

Dominions, and from territories under the Colonial Office. The Conference was opened by Mr F. L. McDougall, a member of the Executive Council of the Imperial Agricultural Bureaux, who pointed out the economic importance of the livestock industry in the territories of the British Empire and the results that have been achieved in the control of animal disease.

At the meeting on the Imperial Bureau of Animal Health, a report was read by the Deputy Director on the work done since the Bureau was opened in 1929. A complete review of current veterinary literature is produced by the Bureau through the agency of *Index Veterinarius* and the *Veterinary Bulletin*. The committee which reported on the work of the Bureau expressed its approval of the work done, and emphasized the extreme importance of the Bureau to all those engaged in veterinary research in the countries of the British Commonwealth of Nations.

The discussion on Foot and Mouth Disease was opened by Mr D. A. E. Cabot, Chief Veterinary Officer, Ministry of Agriculture and Fisheries, Great Britain, who gave an account of the means by which cattle become infected in Great Britain. Resolutions were passed recommending that research should be continued, and that countries in which the disease was not endemic should enforce precautions against the risk of infection being introduced from outside. In such countries prophylactics should be used only with the greatest caution.

The discussion on Caseous Lymphadenitis of sheep was opened by Lieutenant-Colonel Reid of New Zealand, and Mr Max Henry gave an account of the work done on the disease in Australia.

Dr E. A. Watson of Canada opened the discussion on virus diseases of animals, which dealt mainly with methods of immunizing animals against virus diseases. A resolution was passed emphasizing the need for further research into the nature of viruses and their relations with their hosts, and into problems of diagnosis and control. The Conference also stressed the danger inherent in immunization methods in connexion with newly-recognized virus diseases, and urged the application to virus diseases of methods of eradication, wherever the circumstances of the territory render this policy practicable.

Mr Max Henry of Australia opened the discussion on Laryngotracheitis, Infectious Bronchitis and Coryza of poultry, and Mr Dobson, of the Ministry of Agriculture's Veterinary Research Laboratory, read a paper on the disease as it occurs in Great Britain.

The discussion on blowflies of sheep was opened by Dr I. Clunies Ross of Australia, who gave an account of the work done in his country. Dr Hobson and Mr W. Moore described investigations that have been carried out in Wales and Scotland respectively.

Professor Dalling opened the discussion on Fowl Paralysis and gave an account of what is known of the disease at the present time.

Dr C. S. M. Hopkirk of New Zealand opened the discussion on Bovine Mastitis, and Professor Minett described those methods of control which have so far been found successful.

Major Dunkin opened the discussion on Johne's Disease, giving an account of the preparation of the diagnostic agent (johnin). The Conference passed a resolution urging on all Governments the necessity of a reliable diagnostic agent in the eradication of the disease.

Captain Datta, who opened the discussion on Chronic Bovine Haematuria, described the work he has carried out, which has incriminated a fungus of the *Aspergillus* group as a cause of the disease.

GREAT BRITAIN. (1938). **Report of the Agricultural Research Council for the period October, 1935–September, 1937.** pp. vi+378. 2 appendixes. [Numerous refs.] London: H.M. Stat. Off. [8vo] [5s. 6d.]

During the period under review more than three-fifths of the special research grants approved by the Council were allocated to research on animal diseases. Also a large capital expenditure was incurred towards the establishment of a Field Station under the Council's direction. The station is primarily intended to supply disease-free animals of known history and to give adequate facilities for research on a field scale.

The Provisional Note of Administrative Arrangements which was revised in August, 1935, has given the Council wider powers and so increased its usefulness.

The following sections in the report are of special interest :–

ANIMAL NUTRITION AND HUSBANDRY.—The question of nutrition and disease is dealt with at the following centres :– " border pining " in sheep in Northumberland, at Armstrong College, Newcastle-on-Tyne; vitamin A-deficiency in pigs at the National Institute for Research in Dairying, Reading and at the Veterinary Laboratory, Ministry of Agriculture and Fisheries, Weybridge; metabolism of fats at the Royal (Dick) Veterinary College, Edinburgh; ketosis in ruminants at the Veterinary Laboratory, Weybridge, the Rowett Research Institute, the Moredun Institute, and the National Institute for Research in Dairying, Reading, and, lastly, iodine deficiency and thyroid disease at the Rowett Research Institute, University College Medical School, and at the Veterinary Laboratory, Weybridge.

ANIMAL BREEDING.—The main Institutes concerned with this subject are the Institute of Animal Genetics, Edinburgh and the Small Animal Breeding Institute, Cambridge. At the former, studies on the breeding of poultry and an investigation on the factors which influence the inheritance of milk yield or quality are in progress. At Cambridge, investigations are being carried out on reproduction, causes of sterility, the influence of heredity and management on the quality of carcasses as meat, and the genetics of poultry.

ANIMAL DISEASES.—The report refers to the shortage of trained investigators and to the subject of veterinary education, which was being considered by an interdepartmental committee [see p. 194].

Under the heading " Special Researches " a review is given of the work carried out by the specialist committees on the following :– fowl paralysis and coccidiosis, brucella infection, tuberculosis, Johne's disease, braxy, swine fever, necrotic enteritis, helminth disease, mastitis, sheep blowflies, grass sickness and other diseases of horses, and foot and mouth disease.

Under " Miscellaneous Researches ", work on sterility in cows, mortality among calves, lactation tetany and enzootic pneumonia in sheep is reviewed.

In the appendixes a list of grants sanctioned by the Council is given and also a complete index of government departments, institutions and other bodies and scientific subjects referred to or included in the report.—J. C. WALLACE.

GREAT BRITAIN. (1938). **University of Reading, National Institute for Research in Dairying. Annual Report for the Year ending 30th September, 1937.** [KAY, H. D.] pp. 80. 8 tables. Reading: Nat. Inst. Res. Dairying. [4to].

The report consists of two sections: the first deals with changes in staff, appointments, the financial position and an appeal for funds for new buildings, and the second gives the reports of the various departments.

The Institute herd, having passed tuberculin tests without reactors in March and October, 1937, qualified for an official test under the Attested Herds Scheme

of the Ministry of Agriculture and Fisheries. The official tuberculin test in December, 1937, disclosed no reactors, and so a Certificate of Attestation was issued. An attempt to control Contagious Abortion by segregating reactors to the blood agglutination test was made, with encouraging results.

Research work by the Dairy Husbandry Department included such subjects as inheritance of milking qualities, protein requirements of dairy cows, artificial insemination, and nutritional anaemia of pigs, in addition to many others.

The Bacteriology Department continued work on the effect of high temperature short-time pasteurization of milk, mastitis, and the agglutination test for contagious abortion. The Physiology and Biochemistry Department carried out research work on the effect of commercial sterilization on the nutritional value of milk, on the nutritive value of dried and evaporated milk, and on vitamins. Summaries of publications by the staff are given.—J. C. WALLACE.

—. (1938). [**Work at**] **The Rowett Research Institute, Bucksburn, Aberdeen** [**in 1937**].—*Trans. Highl. agric. Soc. Scot.* **50.** 207-208.

The results of an experiment carried out in collaboration with the North of Scotland College of Agriculture showed that few stomach worms develop in well-fed lambs, which received the same number of stomach worm larvae by the stomach tube as did badly-fed lambs.

FOWL PARALYSIS research supported the view that an infective agent is concerned with the aetiology of this disease.

Information is given on an experiment designed to indicate the nutritional conditions which may predispose to PREGNANCY TOXAEMIA in sheep. The work did not confirm the view that lack of exercise and excessive fatness are predisposing causes.—J. C. WALLACE.

INDIA. (1937). **The Annual Report of the Director, Pasteur Institute of Southern India, Coonoor, for the Year Ending 31st December 1936, together with the Thirteenth Annual Report of the Central Committee of the Association for the Year ending 31st March 1937.** [IYENGAR, K. R. K.] pp. 89. Numerous tables, 9 appendixes. Madras: The Madras Publishing House Ltd. [8vo].

The number of patients, both European and Asiatic, undergoing antirabic treatment showed a considerable increase over that for the previous year. The shortest period of incubation noted was 11 days (from a jackal bite) and the longest, 257 days (serious bites from a dog). 64,120 c.c. of 5% vaccine (Semple's carbolized sheep vaccine) were issued to the veterinary staffs of Madras Presidency and Indian States. 659 animals (including 536 dogs) were treated, but no results are given. During the years 1923-36, antirabic treatment was given to 3,105 animals, of which 86 died (2·77%).—F. J. ANDREWS.

BASUTOLAND. (1937). [**Report of**] **Veterinary and Livestock Division** [**1936-1937**]. [HENDERSON, G. T.]—*Rep. Dep. Agric. Basutoland, 1937.* pp. 38-70. 15 tables.

STAFF.—The staff consists of the P.V.O. and eight European agricultural and livestock officers, with native assistants. The total cost was £22,149. An equine improvement scheme provided the services of 20 stallions and seven donkey jacks to approved native residents. Bulls and rams are also provided under schemes for the improvement of livestock. There is only one dipping tank in Basutoland.

ANIMAL CENSUS.—Cattle, 411,931; stallions, 13,796; mares, 45,668; geldings, 25,553; donkeys, 22,766, and mules 1,068.

ANIMAL DISEASES.—Twelve cases of ANTHRAX were detected. All cattle are inoculated annually against ANTHRAX with spore vaccine; in infected areas this is done biannually. Other diseases prevalent are:– STRANGLES, BLACKLEG, ACTINOMYCOSIS, PIROPLASMOSIS, ANAPLASMOSIS, AFRICAN HORSE-SICKNESS, and BLUETONGUE (catarrhal fever) of sheep. There has been no SHEEP SCAB for five years. *Melophagus ovinus* infestation and TICK PARALYSIS (caused by *Ixodes rubicundus*) are prevalent. The sheep blowfly is not a menace.

Compulsory monthly treatment of sheep and goats for helminth infestations is proving very satisfactory in restoring these animals to a healthy condition. *Oestrus ovis* (the nasal fly) is very prevalent and causes mortality in the lowlands. *Stomoxys calcitrans* is said to cause mortality after shearing in the lowlands during the wet season. PEDICULOSIS is almost universal. An important part of the division's work is the improvement of sheep and wool.—J. A. GRIFFITHS.

GOLD COAST COLONY. (1937). **Report on Animal Diseases, 1936.** [MACKAY, J. M.]—*Rep. med. Dep. Gold Coast, 1936.* pp. 19 and 25-26.

One case of generalized TUBERCULOSIS in an ox was reported. Sporadic cases of ANTHRAX, CONTAGIOUS PLEURO-PNEUMONIA, and EPIZOOTIC LYMPHANGITIS are reco.ded.

Reference is made to the value and limitations of clearings in the control of human TRYPANOSOMIASIS and the danger of subsequent soil erosion.

The incidence of canine RABIES is declining, although the whole country remained a declared infected area. Ample supplies of the canine vaccine were produced by the Animal Health Department.

A marked fall in incidence of *Cysticercus bovis* occurred in the Tamale area as a result of adequate latrine accommodation in neighbouring villages and the kraaling of cattle outside the villages.

A French Company commenced the importation for slaughter of cattle from the Cameroons.—F. H. MANLEY.

NYASALAND PROTECTORATE. (1938). **Report of the Veterinary Department for the Year ended 31st December, 1937.** [DE MEZA, J.] pp. 23. 4 tables. Zomba: Govt. Printer. [fcp] [1s.]

The staff consisted of four veterinary officers, two stock inspectors and 253 natives, and the expenditure was £8,492.

ANIMAL DISEASES.—A serious outbreak of TRYPANOSOMIASIS in North Nyasaland interfered with the export trade in cattle to Tanganyika. The disease is controlled by quarantine and the treatment of infected animals. The trypanosomiasis position in the Southern Province was satisfactory; only one serious outbreak of *Tryp. congolense* infection occurred and there were also a few minor outbreaks due to *Tryp. vivax*.

There was an outbreak of EAST COAST FEVER in the Southern Province (a non-enzootic area). This was the only recurrence of the disease since 1921, when dipping measures were first enforced to control outbreaks which occurred in that year. Quarantine and "five-day dipping" with hand dressing brought the outbreak under control. Other tick-borne diseases were kept under control except where regular dipping was not enforced.

No cases of ANTHRAX, BOVINE CONTAGIOUS ABORTION, BLACKLEG, or SWINE FEVER were recorded. [RINDERPEST and CONTAGIOUS BOVINE PLEURO-PNEUMONIA do not occur]. RABIES caused anxiety, and a special committee is sitting to consider means of eradication. There is a local strain of AFRICAN HORSE-SICKNESS (Blantyre strain) which is now incorporated in the Onderstepoort vaccine. Good results

were obtained in a few cases of bovine and canine BABESIASIS treated with acaprin. A large section of the report concerns Animal Husbandry, which is dealt with by the Department.—J. A. GRIFFITHS.

NYASALAND PROTECTORATE. (1938). **Annual Report of the Medical Entomologist for 1937.** [LAMBORN, W. A.]—*Med. San. Rep. Nyasaland, 1937.* pp. 59-61.

The bulk of the report is concerned with tsetse surveys in various parts of the country. Mention is made of the areas in which the fly is diminishing, and the causes contributing to the retreat of the fly are discussed. The main cause of the falling off in the numbers is considered to be the dearth of animal life on which the flies depend for food, and this dearth is coincident with an excessive amount of game shooting. The rifle is now playing the chief part in reclaiming Northern parts of the Dowa and Fort Manning districts. Observations were also made on the parasites of tsetse in Monkey Bay area, but they do not appear to be an important factor in the reduction of the fly there.—F. H. MANLEY.

UGANDA PROTECTORATE. (1938). **Annual Report of the Veterinary Department for the Year Ended 31st December, 1937.** [POULTON, W. F.]—*Rep. vet. Dep. Uganda, 1937.* pp. 3-14. 10 tables.

STAFF.—The British Veterinary staff numbered 12 including the single research officer.

ANIMAL DISEASES.—ANTHRAX is common in Ankole and Masaka, and the prohibition of export of hides and skins from the former was considered. Field work on TUBERCULOSIS was not undertaken; the incidence remains as in previous years. FOWL TYPHOID occurs throughout Uganda. BLACKLEG has a wide distribution. TRYPANOSOMIASIS is wide-spread in the western and northern areas. Details are given of the campaign against RINDERPEST; the Northern Province had no outbreaks and the losses in the Eastern Province were not serious. Three tables show the number of outbreaks and the number and distribution of inoculations and vaccinations. FOOT AND MOUTH DISEASE control had to be relaxed owing to numerous outbreaks and the disease is now wide-spread. The strict quarantine control measures prevented the spread of CONTAGIOUS BOVINE PLEURO-PNEUMONIA from the Karamoja. One case of RABIES was reported in the West Nile District, Northern Province.

The work on *Glossina* investigation and reclamation was carried out with increased vigour during the year. There is a reduction of *Gl. morsitans* throughout South Ankole—in one area the takings of tsetse flies were reduced to under 40 in over a month as against hundreds a day four years ago.

The report concludes with sections dealing with other aspects of animal industry.—J. C. WALLACE.

UGANDA PROTECTORATE. (1938). **Annual Report of the Senior Veterinary Research Officer, Entebbe, for 1937.** [CARMICHAEL, J.]—*Rep. vet. Dep. Uganda, 1937.* pp. 17-24. 1 table.

Laboratory products issued were:– RINDERPEST serum 8,395 litres, and rinderpest vaccine, 344·9 litres. The total routine examinations of material for diagnosis numbered 11,791.

The output of rinderpest vaccine exceeded that of previous years. It was noted that the vaccine when kept for nine months under field conditions lost 75% of its immunizing properties; a dose of 40 c.c. was necessary in adult cattle instead of 10 c.c. Experiments to establish a neurotropic strain of the rinderpest virus in the brains of white mice were not successful. An attempt to grow the virus

on the chorio-allantoic membrane of developing chicks failed. Rinderpest was studied in certain species of African antelope ; the very rapid course of the disease is referred to, *e.g.* death in 48 hours after the onset of symptoms in bushbuck and sitatunga, and in 24 hours in reedbuck and oribi.

Ankole and zebu cattle were found to be fairly resistant to artificial infection with *Trypanosoma rhodesiense*. Surfen C gave unsatisfactory results in the treatment of calves infected with *Tryp. congolense*.

Investigations on the relationship between East Coast Fever and Turning Sickness were continued. The chronic case referred to in last years report is still under observation—the animal is in good condition and shows turning movements at intervals. Attempts to transmit turning sickness failed, but studies of P.M. lesions suggest a close connexion with E.C.F. Research into the comparative susceptibility of zebu and ankole cattle to tuberculosis has been commenced. Actinomycosis was diagnosed for the first time in Uganda ; the material sent to the laboratory was a retropharyngeal gland from a Karamojan bullock.

Experiments were made to determine the thermal death point of *Cysticercus bovis*. Cysts in warm ox bile-saline were unaffected by a temperature of 45°C. for half an hour, but 75% were killed at a temperature of 50°C. in one minute. Details are given of an investigation into the cause of deaths in hippotamuses in the Lake George-Kazanga Channel area. The work is in an early stage.—J. C. W.

Zanzibar Protectorate. (1938). **Report on Veterinary Work in 1937.** [Miller, R. W. R. (Director of Agriculture).—*Rep. Dep. Agric. Zanzibar, 1937*. pp. 8-10.

Fazal Din Ahmedi was appointed Veterinary Officer.

There are approximately 35,000 cattle in the Protectorate. The large herds exist near the Town boundaries, most of them being at Mtoni Government Plantations ; they consist largely of African, Indian and European cross-bred types. Goats are numerous, but the exact number is not known. Cattle, goats and sheep are imported for slaughter. Other imported animals pass through quarantines, where the cattle are double-dipped.

No tsetse fly exist on the island. Trypanosomiasis was detected in 1% of the cattle at Mtoni. The infected animals were slaughtered.

Animal husbandry has been neglected except in the region of Zanzibar Town. Castration of scrub bull calves has commenced. One cattle importer has started shade drying of hides and skins.

Two pupils have been attached to the Veterinary Officer for training in assistant's duties.—F. H. Manley.

Hong Kong. (1938). **Annual Report of the Colonial Veterinary Surgeon for the Year 1937.** [Mackenzie, W. J. E.] pp. 5. 1 table. [8vo].

Animal Products.—390,519 swine, 72,218 cattle and 18,502 sheep and goats were admitted to the abattoir, of which the revenue was 242,302 dollars. 15,154 lb. of diseased meat were destroyed. A large amount of lard and other pork products were exported.

Animal Diseases.—In the depots amongst other diseases, 63 cases of Swine Erysipelas, 36 cases of Foot and Mouth Disease in cattle, and 23 cases of Swine Fever were encountered. Statistics for the quarantine station are given ; three cases of Glanders were encountered.

Two cases of Rabies were confirmed by the Government Bacteriologist. —F. H. Manley.

TRINIDAD AND TOBAGO. (1937). **Annual Medical and Sanitary Report for the year ended on the 31st December, 1936.** [RANKINE, A.] pp. 60. Numerous tables, 2 maps. Trinidad and Tobago: A. L. Rhodes, Govt. Printer. [fcp] [60c.]

RABIES.—Four human and 228 animal cases of paralytic rabies are reported. In 21 bats of abnormal habits the virus of rabies was determined by animal inoculation and the detection of Negri bodies, and in 16 others by animal inoculation only. Bats were seen fighting with each other and with cats, dogs and goats.

The incubation period in artificially inoculated bats ranged from 9 to 105 days. The symptoms in bats are described, and it was shown that recovery in the bat is possible, and that the recovered animal may be a carrier of the disease. The difficulty of control under these circumstances is pointed out. The scheme for the destruction of *Desmodus* bats continues. 3,623 were captured, and 2·7% showed Negri bodies. Vaccine is prepared for human and animal inoculation.

UNDULANT FEVER.—Preliminary observations indicated that a high percentage of human sera reacted to *Brucella abortus* and *Br. melitensis*.—F. H. MANLEY.

UNITED STATES OF AMERICA. (1935). **Report of the Chief of the Bureau of Animal Industry for the Year Ending June 30th, 1935.** [MOHLER, J. R.] pp. 55. 24 tables. Washington: U.S. Govt. Printing Office. [8vo] [5 cents].

A short introduction dealing with certain features of the work is followed by reports of each division of the Bureau.

ANIMAL HUSBANDRY DIVISION. [SHEETS, E. W., SPENCER, D.A., and MCPHEE, H. C.]

Investigations on the inbreeding of swine and also of g. pigs were continued. Feeding experiments on rats and pigs to determine the influence of food intake on growth and development are recorded. The division carried out investigations on dressed meat, beef and dual-purpose cattle, feeding of sheep, goats' milk, wool, breeding and feeding of swine, and the rearing of foals.

Research on poultry breeding, physiology, hatchability of eggs, and feeding was carried out. Earlier work showing that excessive quantities of cod-liver oil (more than 4% of the total feed consumed) decreased egg production and hatchability was confirmed.

BIOCHEMICAL DIVISION. [DORSET, M.]

Data are presented of tests on the germicidal power of various dyes, of benzylphenol and of chlorinated phenol derivatives.

An experiment on the use of the whole-blood stained-antigen test for the diagnosis of *Brucella abortus* INFECTION gave encouraging results.

The amounts of tuberculin and mallein issued were :– 3,135,400 c.c. of intradermal tuberculin, 8,280 c.c. of avian tuberculin, and of 1,233 c.c. of mallein.

Results of work on three vaccines against SWINE FEVER are given, *viz*, glycerinated, phenolized and crystal violet. The last-mentioned was most successful, and further research is being undertaken.

EXPERIMENT STATION. [COTTON, W. E.]

Brucella abortus INFECTION.—One experiment, in which 20 heifers were inoculated with various amounts of live culture and infected *via* the conjunctiva after service, indicated that the dose of vaccine was not very important, and probably a small dose of live vaccine is adequate for immunization. In another experiment the results of calfhood vaccination were compared with those of vaccination of yearling maiden heifers. Further work is necessary before definite conclusions are possible.

Tuberculosis.—Studies in the so-called " skin tuberculosis " were continued but no scientific progress was made.

Vesicular Exanthema of Swine.—Lesions of this disease resemble so closely those of vesicular stomatitis and foot and mouth disease that inoculation of animals is necessary to differentiate between them. G. pigs, cattle, sheep and goats appear to be immune to the virus.

Field Inspection Division. [Pope, G. W.]

Mange.—The number of sheep in flocks in which infection was found totalled 79,960. Cattle mange eradication did not make much progress and the emergency movement of cattle owing to the drought caused spread of this disease. The number of cattle in infected herds was 219,338. This division is also concerned with preventing the entry into the country of contagious animal diseases, and the inspection and humane handling of export animals.

Meat Inspection Division. [Steddom, R. P.]

Statistics on disease conditions found in the state abattoirs are given. 72,736,000 animals were slaughtered under inspection in 746 establishments.

Packers and Stockyards Division. [Miller, A. W.]

This section deals with the operation of stockyards under the laws regulating their work.

Pathology Division. [Schoening, H. W.]

Three cases of Glanders, ten cases of Dourine and one of Rabies were diagnosed.

Research.—Reports are given of investigations on the following conditions :– bovine mastitis, swine erysipelas, actinomycosis, equine infectious encephalomyelitis, equine infectious anaemia, rabies, " cornstalk " disease, " alkali disease ", and shipping fever.

A list of plants, etc., tested for poisonous properties is given. Experiments to find an antidote for cyanide poisoning indicated that a combination of sodium nitrite and sodium thiosulphate was most promising.

Division of Tick Eradication and Special Diseases. [Mackellar, W. M.]

Tick eradication showed further progress, no new areas being requarantined and 12,800 square miles of territory being released.

Thirty Bureau veterinarians were engaged in Swine Fever eradication, and 2,256 outbreaks were reported during the year.

Tuberculosis Eradication Division. [Wright, A. E.]

The eighth survey, completed in May, 1935, revealed the approximate degree of bovine tuberculosis for the entire country to be 0·6% as against 4% at the first survey in 1922. During the year, 25,237,532 tuberculin tests were carried out on cattle. The percentage of reactors was 1·5 as in 1934. 5,590,863 herds were under supervision at the end of the year. From 1917 to 1935, 3,302,561 reactors were removed from herds. Twenty-two states and 79% of all counties in the U.S.A. were " modified accredited areas " on June 30th, 1935. Tuberculosis was found in 7,508 flocks of poultry out of 345,000 situated in 21 states.

According to tests with avian tuberculin and johnin, Johne's disease existed to a slight degree in 11 states. 5·4% of the total number tested were condemned on account of this disease.

A campaign for the eradication of *Brucella abortus* Infection was commenced in July, 1934 ; 3,319,065 cattle were subjected to the agglutination test and 11% reacted. The tests were conducted in four states and indicated that about 40% of the herds were infected.

A plan for the eradication of MASTITIS was put into operation. Clinical examination of 3,808 herds, comprising 95,000 cattle, resulted in the removal of 11,683 advanced cases.

DIVISION OF VIRUS-SERUM CONTROL. [SKIDMORE, D. I.]

This division supervises the commercial preparation of biological products for use against animal diseases, and a list of those manufactured is given, 82 establishments being licensed for the purpose.

ZOOLOGICAL DIVISION. [HALL, M. C.]

Research on protozoan and helminth parasites is recorded, and also experiments on the treatment of animals infested with internal and external parasites.

Studies on STRONGYLOSIS of horses showed that deep ploughing was of value in controlling this condition. Field investigations on the infestation of cattle with liver fluke indicated that lasting results depend primarily on effective drainage.

STEPHANOFILARIASIS, a skin disease of bovines, is known to have occurred in 14 States. Investigations were carried out on the life-history of the parasite causing the disease.—J. C. WALLACE.

UNITED STATES OF AMERICA. (1936). **Report of the Bureau of Animal Industry for the Year Ending June 30th, 1936.** [MOHLER, J. R.] pp. 60. 24 tables. Washington: U.S. Govt. Printing Office. [8vo] [10 cents].

About 10,000 carcasses out of 62,000,000 inspected were condemned for bovine TUBERCULOSIS during the year, as compared with 28,000 in 1935. The U.S.A. remained free from FOOT AND MOUTH DISEASE, RINDERPEST, CONTAGIOUS PLEURO-PNEUMONIA and SURRA during the period under review.

ANIMAL HUSBANDRY DIVISION. [McPHEE, H. C.]

Numerous investigations in relation to livestock improvement are recorded, and include such subjects as dressed meat, beef and dual-purpose cattle, feeding of sheep, goats' milk, wool, breeding and feeding of swine, breeding of draught horses, and breeding and feeding of poultry.

It is noted that 75% of the states have adopted the national poultry improvement plan, which started on July 1st, 1935. Its objectives are :– (a) the improvement of breeding qualities of poultry; (b) the reduction of losses from PULLORUM DISEASE, and (c) the adoption of a more uniform terminology to describe breeding poultry, hatching eggs and chicks.

BIOCHEMICAL DIVISION. [CHAPLIN, R. M.]

Work on the crystal-violet vaccine against SWINE FEVER was continued. Immunity appeared to be established at 14 days. Of 152 pigs vaccinated and subsequently exposed to virus, 131 remained healthy, 17 showed slight reactions and four severe reactions, but none died.

Data on various tests of the germicidal powers of dyes are presented. The work of the division also included tests of dips, disinfectants, antiseptics and anthelmintics.

The amounts of tuberculin and mallein issued were :– 1,965,000 c.c. of intradermal tuberculin, 10,400 c.c. of avian tuberculin and 2,167 c.c. of mallein.

Abortin was being tried and results were said to be promising, but no details are given in this report.

The result of a field experiment, using 13,000 cattle, to test the whole-blood stained antigen method for the diagnosis of *Br. abortus* INFECTION indicated that it was satisfactory, but veterinarians conducting the test required special training and equipment.

ANIMAL DISEASE STATION. [COTTON, W. E.]

Brucella abortus INFECTION.—Studies in calfhood vaccination were continued. Laboratory experiments to the end of the year indicated that the method was "80% effective". A field experiment was commenced.

TUBERCULOSIS.—A paper dealing with the causes of sensitization of cattle to tuberculin other than that due to bovine tubercle bacilli was prepared. An investigation into the source of infection responsible for the introduction of tuberculosis into the herd of the bureau of Dairy Industry, Beltsville, was carried out.

FIELD INSPECTION DIVISION. [POPE, G. W.]

MANGE.—The total number of sheep in flocks in which sheep scab was found was 160,377. Cattle mange showed a slight increase over 1935; the number of cattle in infected herds was 230,489. No cases in horses were reported during the year.

The division was also concerned with preventing the entry into the country of contagious animal diseases and with the inspection and humane handling of export animals.

MEAT INSPECTION DIVISION. [PISTOR, A. J., and JOSS, E. C.]

Statistics on disease conditions found in the state abattoirs are given. 61,970,474 animals were slaughtered under inspection in 725 establishments.

PACKERS AND STOCKYARDS DIVISION. [MILLER, A. W.]

This section deals with the operation of stockyards under laws regulating their work.

PATHOLOGY DIVISION. [SCHOENING, H. W.]

One case each of GLANDERS and DOURINE and two cases of RABIES were diagnosed.

RESEARCH SECTION.—A report is given on the progress made in research on bovine mastitis, swine erysipelas, *Brucella suis* infection, equine infectious encephalomyelitis, equine infectious anaemia, and avian infectious laryngotracheitis. Experiments carried out on the use of sodium bicarbonate as a preventive against shipping fever seem to show that this remedy is unreliable.

Fourteen cases of suspected TUBERCULOSIS in sheep were studied. Examination of 11 specimens was completed and in each case it was shown that the avian type of tubercle bacillus was responsible. Details are given of work undertaken in co-operation with the Zoological Division on the application of the complement-fixation test in the diagnosis of ANAPLASMOSIS. It was ascertained that the test was not satisfactory for the detection of carriers.

DIVISION OF TICK ERADICATION AND SPECIAL DISEASES. [MACKELLAR, W. M.]

Tick eradication showed further progress, 5,532 square miles of territory being released from quarantine.

Thirty Bureau veterinarians were engaged in swine fever eradication and 3,332 outbreaks were reported during the year.

TUBERCULOSIS ERADICATION DIVISION. [WIGHT, A. E.]

During the year, 22,918,038 tuberculin tests were carried out on cattle. The percentage of reactors was 0·7, as against 1·5 in 1935. 6,515,273 herds were under supervision at the end of the year. Between 1917 and 1936, a total of 3,468,057 reactors were removed from herds. The number of states in the "modified accredited area" on June 30th, 1936, was 40. Tuberculosis was found in 6,000 flocks of poultry out of 237,449 situated in 21 states.

According to tests with avian tuberculin and johnin, Johne's disease existed to a slight degree in 11 states; 5·2% of the total number tested were condemned,

The voluntary campaign for the eradication of *Br. abortus* Infection was continued. About 6,600,000 cattle were subjected to the agglutination test and 7 % reacted.

Under the Mastitis plan, 8,993 herds containing 140,435 cows were clinically examined, and 16,756 advanced cases were removed.

Division of Virus-Serum Control. [Skidmore, D. I.]

This division supervises the commercial preparation of biological products for use against animal disease, and a list of doses manufactured is given. Seventy-seven establishments were licensed for this purpose.

Zoological Division. [Hall, M. C., and Schwartz, B.]

Data are presented on experiments on the treatment of animals infested with internal and external parasites.

The study of the development and comparative morphology of infective horse strongyle larvae was continued. Experiments showed that, when horse faeces containing strongyle eggs were buried [depth not stated], the eggs hatched and the larvae migrated to the surface in all kinds of soils.

Other investigations recorded include :– the effect of small intestinal trichostrongyles on food required and wool produced by sheep, the control of liver fluke in sheep and cattle, diagnosis of anaplasmosis in carriers, and immunization against anaplasmosis, warbles, lungworms in swine and trichinosis.—J. C. Wallace.

United States of America. (1937). **Report of the Bureau of Animal Industry, for the Year Ending June 30th, 1937.** [Mohler, J. R.] pp. 64. 23 tables. Washington : U.S. Govt. Printing Office. [8vo] [10 cents].

In the introduction, reference is made to the progress of the Tuberculosis Eradication Campaign and experiments on calfhood vaccination for Brucella infection which are dealt with below.

Animal Husbandry and Animal Nutrition Divisions.
[McPhee, H. C., and Howe, P. E.]

The Animal Husbandry Division carried out research in livestock breeding and management, and the Animal Nutrition Division in livestock nutrition and feeding, including the chemistry of food and animal products. The investigations covered such subjects as dressed meat, breeding and feeding of small animals, beef and dual-purpose cattle, feeding and breeding of sheep, goat's milk, wool, feeding and breeding of swine, and poultry breeding and feeding.

Biochemical Division. [Chapin, R. M.]

Work on the crystal-violet vaccine against Swine Fever was continued ; very good results are claimed. Experiments showed that the antigenic power of the vaccine was inhibited by anti-hog cholera serum given about a month before or a week after vaccination ; the protection given to sucking pigs from immune sows was also unsatisfactory.

Work on dips, disinfectants, antiseptics and anthelmintics also occupied the division.

The amounts of tuberculin and mallein issued were :– 1,354,470 c.c. of intradermal tuberculin, 16,760 c.c. of avian tuberculin, and 856 c.c. of ophthalmic mallein. Experiments with abortin proceeded, but definite conclusions were not available.

Animal Disease Station. [Cotton, W. E.]

Br. abortus Infection.—Details are given of calfhood vaccination experiments and it is noted that field trials were being conducted. Studies in the transmission

of *Br. suis* indicated that after exposure to infection for brief periods, cattle might react to the agglutination test, but that the danger of cattle becoming infected was negligible.

Tuberculosis.—Examination of the reactors from the herd of the Bureau of Dairy Industry Experiment Station, Beltsville, indicated that the infecting organisms were of only moderate virulence. Studies on so-called skin lesion cases were continued.

Vesicular Exanthema of Swine.—Experimentally, this disease is not highly contagious and, in this respect, resembles vesicular stomatitis more closely than foot and mouth disease.

Field Inspection Division. [Pope, G. W., and Fladness, S. O.]

Mange.—The number of sheep in flocks in which sheep scab was found totalled 42,998. Cattle mange was found in 383 herds containing 229,277 cattle. No cases of mange in horses were reported during the year. Mange was reported as still present in goats in Texas.

The division is also concerned with preventing the entry into the country of contagious animal diseases, and with the inspection and humane handling of export animals.

Meat Inspection Division. [Joss, E. C.]

Statistics on disease conditions found in the state abattoirs are given. 71,223,306 animals were slaughtered under inspection, in 712 establishments.

Packers and Stockyards Division. [Miller, A. W.]

This section deals with the operation of stockyards under laws regulating their work.

Pathology Division. [Schoening, H. W.]

One case each of Glanders and of Rabies were diagnosed. No cases of Dourine were found.

Data are presented of investigations on the following conditions :– mastitis, tuberculosis, swine erysipelas, actinomycosis, equine encephalomyelitis, equine infectious anaemia, and anaplasmosis. Examination of material from 16 suspected cases of Tuberculosis in sheep revealed acid-fast organisms in 15 specimens, the causal organism in each case being demonstrated as the avian type of tubercle bacillus.

A list of poisonous plants tested is given. Further studies of bighead in sheep showed that certain foods were a predisposing factor in the cause of this disease by *Tetradymia glabrata.*

Division of Tick Eradication and Special Diseases. [MacKellar, W. M.]

Tick eradication showed further progress, no areas being requarantined during the year ; 28,150 sq. miles of territory were released.

Thirty Bureau veterinarians were engaged in swine fever investigation and control, and 3,522 outbreaks were reported during the year.

Tuberculosis Eradication Division. [Wight, A. E.]

During the period under consideration 13,750,308 tuberculin tests on cattle were carried out. The percentage of reactors was the same as in 1936, *viz*, 0·7. 6,745,471 herds were under supervision at the end of the year. Between 1917 and 1936 a total of 3,562,161 reactors were removed from herds. The number of states in the " modified accredited area " on June 30th, 1937, was 44. The condemnations of cattle carcasses for bovine tuberculosis were less than two-thirds as many as in 1936. Tuberculosis was found in about 3,000 flocks of poultry out of 128,351 situated in 12 States.

According to tests with avian tuberculin and johnin, Johne's disease existed to a slight degree in 11 states; 6·2% of the cattle tested were removed.

The voluntary campaign for the eradication of CONTAGIOUS ABORTION was continued. About 8,021,000 cattle were subjected to the agglutination test and 5% reacted. Experiments on calfhood vaccine for the prevention of this disease continued to give encouraging results.

DIVISION OF VIRUS-SERUM CONTROL. [SKIDMORE, D. I.]

This division supervises the commercial preparation of biological products for use against animal diseases; a list of doses manufactured is given. Seventy-six establishments were licensed for this purpose.

ZOOLOGICAL DIVISION. [SCHWARTZ, B.]

Data are given of experiments on the treatment of animals infested with internal parasites.

Studies on the effects of ploughing on the eggs and larvae of horse strongyles were continued. The division co-operated with the Pathological Division in experiments to ascertain whether strongyles were concerned in the transmission of EQUINE INFECTIONS ANAEMIA.

Other research recorded includes:– parasitic diseases of ruminants, *e.g.*, anaplasmosis, coccidiosis, liver fluke, tapeworms, nematodes and warbles; parasites of swine, *e.g.*, trichinae and stomach worms, and parasites of poultry, *e.g.*, gapeworm and tapeworms.—J. C. WALLACE.

Extracts from Annual Reports of Agricultural Experimental Stations U.S.A.

[The matter given here is a bare outline of the work done. When papers by the staffs of these stations are published abstracts are prepared from them and included in the *Veterinary Bulletin* as a matter of routine. Details of the titles of these reports will be found in *Index Veterinarius*].

ARIZONA, 1936-37. Study was made on INFECTIOUS KERATITIS or pink eye of cattle, animal parasites, poisonous plants (*Senecio sp.*, *Astragalus praelongus*, *Stanleya*) and on the bacterial flora of milk.

FLORIDA, 1936-37. A list of locally important diseases is given. Studies were made on BRONCHO-PNEUMONIA in calves, FOWL PARALYSIS and allied conditions, " salt sick ", a nutritional anaemia of cattle (trials with copper and cobalt), bone fragility, and on rodent control, for which thallium sulphate baits were found more successful than $BaCO_3$ or squill.

HAWAII, 1937. Research was conducted on *Fasciola gigantica* (biology and control), porcine and poultry helminths, experimental anaemia in rats, and the control of rats on the island.

KENTUCKY, 1937. Studies on *Corynebacterium equi* showed that there were two agglutinative types, one isolated from fowls and the other from mares and foetuses, the former causing PNEUMONIA. *Salmonella typhi-murium*, an enzootic infection of pigeons, was found to lack the V factor of White and Kauffman. *S. newport* was isolated from swine and fowls, *S. new brunswick* n. sp. from fowls (formula III XV : lv : 1, 7) and *S. kentucky* from fowls (formula VIII XX : i-z6 : –.). Mastitis was found to be more prevalent in cows with brucella infection than in those without. Data are presented on breeding records in cattle herds. Research, as yet inconclusive, was carried out on PERIODIC OPHTHALMIA. Manganese (36 p.p.m. in the ration) was effective in preventing slipped tendon in chicks and the hatchability of eggs of Mn-deficient hens was very low; in addition, monster chicks resulted.

Massachusetts, 1937. Statistical information is given on poultry disease control, and notes are included on *Erysipelothrix rhusiopathiae* infection in turkeys, " epidemic tremor " in chicks (believed to be due to a filtrable virus), viability of *S. pullorum* (which was viable in dry cloth for five years), and on Fowl Leucosis and allied diseases.

New Hampshire, 1937. Short notes are given on Bovine Mastitis, haemolytic streptococci in milk, calf vaccination against Bovine Brucellosis, Pullorum Disease eradication, Avian Coccidiosis, and vitamin A requirements of poultry.

Texas, 1936. During the year work was done on eradication of Brucellosis from the station herd, Anaplasmosis, inheritance of cryptorchidism in goats, slipped tendon in chicks, swellhead of sheep and goats (toxic and photosensitizing principles of *Lechuguilla*), *Sartwellia flaveria* poisoning, and on the toxic principle of loco (*Astragalus earlei*).

Washington, 1936-37. The Hotis test was found useful in the diagnosis of mastitis ; better results were obtained when normal bovine blood serum was added.

Wisconsin, 1936-37. Notes are given on the following :– abnormal milk ; immune bodies in the blood serum of brucella-infected cattle ; " ceased reactors " (Brucellosis) ; avian Coccidiosis and its prevention by sulphur, and the tendency to rickets in chicks so treated ; cleft palate inheritance in swine, and fertility in bulls.—J. E.

U.S.A. (1936). **Tenth Annual Report of the New York State Association of Dairy and Milk Inspectors Meeting at Schenectady, New York.** pp. 247. Numerous text figs., 1 fig. on 1 plate, numerous tables. [Numerous refs.] Albany, N.Y. : New York State Department of Health. [8vo].

The report consists of a number of articles dealing with various public health aspects of the milk problem. There are papers and discussions on dairy hygiene, the mastitis problem, the bacterial content of milk and its nutritive value, pasteurization and the duties of the milk inspectors. [Abstracts of individual articles appear elsewhere in this number].

BOOK REVIEWS

Astor [Viscount], & Rowntree, B. S. (1938). **British Agriculture. The Principles of Future Policy.** pp. xx + 469. 20 figs., 66 tables. London : Longmans, Green and Co. [8vo] [15s.]

This book is a detailed review of all aspects of the agricultural industry with recommendations on basic principles by which it is considered that the national agricultural policy ought to be guided in the future.

The book is divided into five parts embracing 28 chapters, of which those on Objectives of Agricultural Policy, The Changing Situation of British Agriculture, on the various crops, on the different farm animals, Milk Production, Farming and Research, Education and Advice, are of interest to readers of this *Bulletin*.

Veterinary interest is particularly concerned with those parts dealing with the existing handicaps with reference to losses from disease. Quotations are made from various well-informed sources—chiefly from the reports of special committees of enquiry.

Amongst the recommendations, the position of research into livestock diseases is reviewed ; the paucity of national funds hitherto applied to veterinary research is deplored and the importance of increasing them is stressed. It is also proposed

that the agricultural advisory services should be reorganized on a provincial basis [*cf* the PEP report below] and developed to improve the dissemination of research discoveries. The appointment of advisory experts on each animal species is also advocated [as in the PEP report].

The book is extremely interesting and is especially valuable in that it gives a worker in one special agricultural science a balanced insight into all branches.—J. E.

—. (1938). **Report on Agricultural Research in Great Britain.** pp. 146. 7 tables, 7 appendixes. London: PEP, 16 Queen Anne's Gate, London, S.W.1. [4to] [8s. 6d.]

This report has been produced by a body of voluntary workers enrolled in an organization named PEP (Political and Economic Planning) which has undertaken the duty of examining the present state of various national activities and of making suggestions for improvements.

In this report all branches of agricultural research have been considered, including animal husbandry and animal pathology. Reports and publications of the Ministry of Agriculture, Development Commission, Agricultural Research Council, and Imperial Agricultural Bureaux, etc. have been closely studied, with the result that this report is a very valuable, up-to-date survey of all aspects of the matter, and contains a wealth of detail of great reference value.

There are special chapters on The Structure of Agricultural Research in Great Britain, The Finance of Agricultural Research, The Personnel of Agricultural Research, The Spreading of Scientific Knowledge about Agriculture, and on Agricultural Research Outside Great Britain. Finally there is one entitled Criticisms and Conclusions. There are also seven appendixes giving details of institutions, departments, staffs, costs and other matters.

The chief criticism made is that the link between research and farming is too weak. Many suggestions for improvement in agricultural research are made, chief of which are :– that the Agricultural Research Council should be given wider financial and executive powers, and more extensive control of the organization of research as well as of advisory and extension services ; that the functions of the Imperial Agricultural Bureaux and the advisory services should be extended to cover husbandry organized to deal with individual crops and animals—*e.g.*, a Bureau and advisory service on sheep alone, swine alone, and so on—and that a central extension service should be founded. For details of these, and of other points too numerous to mention, the reader should consult the original.—J. E.

Remlinger, P. [Directeur de l'Institut Pasteur de Tanger], & Bailly, J. [Chef de service à l'Institut Pasteur de Tanger]. (1938). La maladie d'Aujeszky. [**Aujeszky's Disease**]. pp. 204. 16 figs., 18 tables. [Numerous refs.] Paris : Masson et Cie. [8vo] [Fr. 45].

As Aujeszky's disease is known to be relatively wide-spread in many countries, an authoritative survey of recent advances is particularly welcome. The present volume can be warmly recommended as a valuable contribution to our knowledge of the disease.

It is natural that the authors should have drawn extensively on the results of their own work, and numerous personal experiments are quoted in detail. The subject matter is divided into the following main headings :– natural and experimental infections, methods of infection and distribution of the virus in the body, physico-chemical properties of the virus, diagnosis, treatment, and immunity, etc.

The review of the investigations of other workers is admirable, but the book would have possessed an added attraction if certain important articles had not been overlooked. For example, under the heading of ultrafiltration, full details are given of the authors' experiments on the attempted filtration of the virus through collodion membranes with results which were practically negative, while the important observations of ELFORD and GALLOWAY [*V. B.* **7.** 380.], on the filtration and estimation of the size of the virus, are completely ignored.—R. E. G.

WIRTH, D. [O. Professor der Tierärztlichen Hochschule in Wien], & ZWICK, W. [Dr. Med. Vet. H.C., Dr. Sc. Nat., Emerit. O. Professor der Universität Giessen]. (1938). Kompendium der Speziellen Pathologie und Therapie für Tierärzte. **[Special Pathology and Therapeutics for Veterinarians].** pp. xiv + 428. Stuttgart: Ferdinand Enke. [8vo] [RM. 25].

Professor FRÖHNER, who was responsible for the first three editions of this book, and, in conjunction with Professor Zwick, for the fourth, has relinquished the task to Professor WIRTH and is enjoying a well earned retirement. The book has been enlarged and thoroughly revised, although remaining a compendium which is not in any way intended to take the place of the more detailed texts of HUTYRA and MAREK, JOEST, or KITT. The student and practitioner will find in it a brief but comprehensive summary of all the commoner and most of the more rare diseases of the domestic animals as well as those affecting birds and bees.

Diseases are mainly considered under such headings as aetiology, symptoms, diagnosis, pathological anatomy, and therapy. In the first part of the book they are classified according to the organs involved, and the infectious diseases of the various species are dealt with in the second part. Modern views are given on such conditions as leptospiral infection in dogs, trichomoniasis in cattle, neurolymphomatosis in fowls, tularaemia in man and animals and " Isle of Wight disease " in honey bees.

There are no illustrations, however, and the index is not without errors. The book should be useful to students and practitioners but is hardly suitable for the research worker.—E. G. WHITE.

OESTERLIN, M. [Institut für Schiffs- und Tropenkrankheiten, Hamburg]. (1939). Chemotherapie. Ergebnisse, Probleme und Arbeitsmethoden. **[Chemotherapy].**—pp. viii + 359. 39 figs. [Numerous refs.] Brunswick: Friedr. Vieweg & Sohn. [8vo] [RM. 22.50].

The author is a pupil of GIEMSA, and is working at the Institute for Tropical Diseases at Hamburg. As would be expected, he has produced a very satisfactory introduction to the chemotherapy for tropical diseases. The book contains a general discussion of the problem and also a chapter on the question of the resistance of the organisms to chemotherapeutic agents, but its most important parts deal with the problem from the biological and chemical aspects.

One section of the book describes the life-history of the parasites and the method of infection, whilst in the chemical part the various diseases are discussed. The author also deals with methods of demonstrating the chemical agents in the parasites.

An excellent feature is the bibliography attached at the end of each division. The book is well illustrated and indexed, and should prove of great value to those beginning the study of the subject in detail.—J. M. ROBSON.

SCHMIDT, C. L. A. [M.S., Ph.D.; Professor of Biochemistry, University of California], & ALLEN, F. W. [Ph.D.; Instructor in Biochemistry, University of California]. (1938). **Fundamentals of Biochemistry with Laboratory Experiments.** pp. xiv. + 388. 29 figs., 24 tables, 1 appendix. London: McGraw-Hill Publishing Company Ltd. [1st Edit.] [8vo] [18s.]

In view of the large number of excellent books on the fundamentals of biochemistry, one looks for the established knowledge to be presented from a fresh aspect in any new book that appears upon the subject. The present volume aims at being a compromise between a theoretical and a practical book. Its object is " to give the student a background for his laboratory work (and) the aim of the laboratory work is to illustrate some of the facts of biochemistry ". The authors admit that " it is expected that the laboratory course will be supplemented by lectures " and this course is presumably that taught in the University of California. While, therefore, in this course the deficiencies in the theoretical portions of the book are no doubt remedied in the lectures, providing an adequate groundwork for the student biochemist, the somewhat sketchy treatment of the theory must necessarily limit the usefulness of the book for external students.

As a whole the book lacks balance both in the relationship between the theoretical and practical work and in the relative weight attached to the various sections treated. As much space is devoted to informing the student how to utilize a set of logarithmic tables as to the importance of the trace elements. In view of the widely recognized importance of cobalt in nutrition it is surprising to read that " nickel and cobalt are probably not essential elements ". The standard Denis method for the estimation of serum magnesium is not mentioned, the far less extensively used 8-hydroxyquinoline method being the one taught. The preface states that " the technique used in laboratory work, while important, is incidental to the main object of the work " and yet four different methods for the estimation of blood glucose are recommended for practice by the student. Further, the excellent system of advising the reading of specified original works in connexion with each aspect of the subject loses some of its value, especially for students in countries other than the U.S.A., when practically all the works cited are American publications by American authors. A wider bibliography is certainly desirable and would be much more useful.

The treatment of the more fundamentally chemical aspects of the subject is good, the formulae presented being very clear, and it is interesting to note that some of the recent advances into the chemistry of sex hormones and of carcinogenetic substances are included. It is suggested that for future editions, elaboration of the subject matter such as is no doubt supplied in the concomitant lectures, be included in the book to give it a more balanced aspect and hence render it of much wider general appeal.—ALFRED EDEN.

ANON. (1938). **The Pharmaceutical Pocket Book.** pp. 370. 1 fig., numerous tables. London: The Pharmaceutical Press. [13th Edit.] [8vo] [5s.]

This book is published by the Council of the Pharmaceutical Society of Great Britain, and contains a wealth of information of importance to pharmaceutical and analytical chemists, on dispensing, posology, analysis of fluids and foods, weights and measures, poisons and many other items.

It is of great value to veterinarians, whether in practice or research, and there is a veterinary posological table for B.P. and B.P.C. drugs.—J. E.

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INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

The latest list of the publications indexed for this purpose was included in *Index Veterinarius,* Vol. 6, No. 1 (issued December, 1938) and also circulated with the *Veterinary Bulletin,* Vol. 9, No. 1.

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No. 1.—Issued December. Indexing period previous January—June.
No. 2.—Issued June. Indexing period previous July—December.

Vols. 1 to 3 (1933, 1934 and 1935) of the Index were produced on a duplicator; from Vol. 4 onwards it has been printed.

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